

Morrisville Quad.





aton Station

Woodman  
Pond  
1123

Pecksport

01607

Madison Reservoir

1211

1138

1122

Brook

Hamilton

B.M. 1126

Payne

Mud  
Pond

1124  
Randallsville

H A M I L T O N

Parish  
Lake

Poolville

CHENANGO  
RIVER

CANAL

Earville  
Lake

Sangerfield River  
D. L. AND W. R. R.

35

42.45  
7530



At Ashantee under the first dam  
was seen the *Oreodonta*, ~~and~~ just  
across the stream across the dam  
at the pond and at the head a few  
fathoms fresh black shale  
from the first period.

*O. minuta* 10' 10' 10' 10' 10' 10' 10' 10' 10' 10'

These were at 380'

Let me mention a few things on the map  
The 1st cluster that is a short leg  
and quite calcareous, being of fresh  
shale and is the 1st of the series, and  
the 2nd is a more calcareous, being  
most of the same, but is in some  
places in sections. The 3rd is a short leg  
and is a short leg.

The 4th is a short leg  
section at 2nd dam  
Ashantee

The 5th is a short leg  
The 6th is a short leg  
The 7th is a short leg  
The 8th is a short leg  
The 9th is a short leg  
The 10th is a short leg

81  
The 11th is a short leg  
The 12th is a short leg  
The 13th is a short leg  
The 14th is a short leg  
The 15th is a short leg  
The 16th is a short leg

III  
The 17th is a short leg  
The 18th is a short leg  
The 19th is a short leg  
The 20th is a short leg  
The 21st is a short leg  
The 22nd is a short leg

The 23rd is a short leg  
The 24th is a short leg  
The 25th is a short leg  
The 26th is a short leg  
The 27th is a short leg  
The 28th is a short leg



This is a detailed topographic map of a section of Monroe County, New York. The map features the Canawangus River flowing from the upper left towards the center. To the right of the river is a large, irregularly shaped Horseshoe Pond. The town of Canawangus is located in the upper central part of the map, and Ashantee is situated in the lower right. The map is overlaid with a grid of section lines, with section numbers such as 643, 607, 605, 549, 584, 557, 553, 543, 575, 582, 586, 603, 599, 673, 700, 711, and 649. Contour lines are drawn throughout the map, indicating elevation. The word 'PENNSYLVANIA' is written across the middle of the map, and 'ROCHESTER' is written vertically on the right side. A handwritten note in the center-right reads 'on road by first warden's house 560'. A north arrow is located in the lower right corner. The map is titled 'A V O' in large letters at the bottom center.



Above this the shale is fissile  
breaking into paper thin flakes. It  
is crowded with *S. linearis*, *C. minor*,  
small *Schizophoria*, etc.

It is from the top of the Stafford  
to the top of the decayed bridge over  
the creek 35' and the interval is  
occupied by shales.



August 19.

Bear Mountain Ravine

433 paces from the highway bridge the first rock is encountered. It is a soft dark gray shale that is faintly silty, rather crunched. It gives no effervescence with acid. Occasional small rounded or flattened concretionary nodules may be noted. For the first 15' the shales are not very fossiliferous only an occasional *P. discoideum*, *Leiorhynchus* or *S. truncata* being found. But at 15' vertical (3 hand-level steps - 1) *Leiorhynchus* is very abundant and appears to me to be *L. laura*.

3535 Between 20-20 + 25-25 only *Leiorhynchus* was noted as an abundant fossil, but the living chamber of an *Orthoceras* was also seen. Also *Bamburghia*.

Between 25-25 + 30-30 - *L. limitaris*, *L. laura*, *S. crataegus*, *B. umbonata*.

About 30' up was seen a large concretion, circular and about  $1\frac{1}{2}$ ' in diameter. It was of hard blue-gray ls and contained *L. limitaris*. A septarian at the level about 2' in diameter.

35 35-40-40 - *N. trigonata*, *N. subumbonata*, *L. laura*, *Orthoceras*, *B. umbonata*, *C. limitaris*, *C. muscovata*, *Pal. constricta*, *N. trigonata*, Crinoid stems, *P. discoideum*.

These very fossiliferous shales with rather well preserved Ambocoelia come in high in the 8<sup>th</sup> step. New forms are seen here for the first time and this is probably the transition point from the Cardiff to the Skaneateles.



hard band 1'

*P. subrotunda communis*

Septaria

Each square 5'5"

45<sup>th</sup> page



A rock fall from above about 30' showed the following forms. This occurred in the 5'5" interval off the ninth step.

Large Ambocoelias, *T. carinatus*, *A. concinna*, *S. arctostriatus*, *S. perplana*, *S. granulosa*. These probably belong to the third band.

Between 40-40 and 50-50 the rocks are not as fossiliferous as those noted near the top of 40-40 (that is around 42') and the only additional form was a *Loxonema* with a concretion forming about it. *Leiorhynchus* in this interval is larger and not abundant.

Between 50-50 and 60-60 The shales are considerably coarser but *L. lama* was noted. They are also lighter and break into chunky pieces. The rock here also contains many small round concretions some almost perfectly spherical.

The following fossils were observed in a rather softer shale Between 60-60 and 65-65.

*N. oblongatus*

*Panurella* sp.

*P. fragilis*

*N. triquetra*

*L. lama*

*P. discoidum*

*N. corbuliformis*

*Orthoceras* sp.

*M. peggus*

*A. umbonata*

*G. capillaria*

Fauna between 65-65 to 75-75

*Grammysia* sp.

A snail

✓ *L. lama* - very large

*P. fragilis*

✓ *Orthoceras* sp.

*N. triquetra*

*A. umbonata* cc

✓ *Hadrogyrellum*

✓ *C. multostriatus* c

✓ *P. discoidum*

*Bactrites*

*G. subulatum*

The rocks in this interval have become at the top of it somewhat coarser and are very fossiliferous. They are also marked by *Taenium*.



The fossils are rather well preserved and the Ambocoelias especially can be taken entire. Notable is the small coral referred to *Hydrophyllum* and the very small *Atthyrid*. Some of the concretions contain *P. discoidum* but others are masses of *L. limitaris* or *L. laura* in beautifully preserved forms.

The shale between 75-75 and 80-80 is quite sandy and contains a great many small calcareous concretions. The fauna here is as follows.

- |                                         |                           |
|-----------------------------------------|---------------------------|
| <i>Tos. hamiltoniae</i>                 | ✓ <i>S. acrostictus</i> c |
| ✓ <i>S. penultima</i>                   | <i>Orthoceras</i> sp.     |
| ✓ <i>A. spiriferoides</i>               | ✓ <i>C. scitulus</i>      |
| ✓ <i>L. laura</i> c                     | <i>N. triquetra</i>       |
| <i>N. oblongatus</i>                    | <i>Chaetetes</i>          |
| ✓ <i>C. mucronatus</i>                  | <i>Orbiculoides</i>       |
| ✓ <i>C. setigenus</i>                   | <i>P. iowensis?</i>       |
| <i>M. pygmaea</i>                       | <i>Ambocoelia</i> sp.     |
| ✓ <i>Spirifer</i> cf. <i>granulosus</i> |                           |

The Ambocoelias here I cannot place as they are very large. They may be *praecumbens*.

The ls. is about a foot thick and lies 86' above the 453<sup>th</sup> place. It is a compact ls. of a grey color, semi-xln from crinoid remains. It is very hard and resistant to the hammer. Fossils noted in it are:—

- |                       |                     |
|-----------------------|---------------------|
| <i>A. princeps</i>    | <i>C. coronatus</i> |
| Cyathophylloid corals | <i>Spirifer</i>     |
| <i>T. carinatus</i>   | <i>C. laevis</i>    |
| <i>Platyceras</i> sp. |                     |
| <i>C. mucronatus</i>  |                     |

In places the band has considerable shale in it.



The shale for 2' on the hard band is mostly soft but contains some masses of ls. In this shale a short distance from the falls, the following species were recorded:-

- |                          |                        |
|--------------------------|------------------------|
| ✓ <i>S. perplana</i>     | ✓ <i>A. umbonata</i>   |
| ✓ <i>C. mucronatus</i>   | ✓ <i>N. oblongatus</i> |
| ✓ <i>J. acuminatus</i>   | ✓ <i>C. indenta</i>    |
| ✓ <i>N. concinna</i>     | ✓ <i>P. iowensis</i>   |
| <i>Sphenotus</i> sp.     | <i>C. setigera</i>     |
| ✓ <i>Pal. constricta</i> | <i>Lox. hamiltoni</i>  |
| ✓ <i>M. subolata</i> ?   | <i>Goniophora</i> sp.  |
| ✓ <i>M. concentrica</i>  | ✓ <i>P. cylindrica</i> |
| ✓ <i>C. dentis</i>       | ✓ <i>C. thalassina</i> |
| ✓ <i>S. audaculus</i>    | ✓ <i>Pal. plana</i>    |
| ✓ <i>P. radiata</i>      | <i>Productella</i> sp. |
| ✓ <i>D. sculptilis</i>   | <i>Grammysia</i> sp.   |
| ✓ <i>L. rostellata</i>   | ✓ <i>C. scitellus</i>  |

5' 5" above the hard band is a 3' cascade and the following fauna was recorded from the rocks here

- |                         |                         |
|-------------------------|-------------------------|
| ✓ large cup corals.     | <i>Lox. delphinea</i>   |
| ✓ <i>R. vanuxemi</i>    | <i>Prana</i>            |
| ✓ <i>S. audaculus</i>   | ✓ <i>A. umbonata</i>    |
| <i>Platyceras</i> sp.   | ✓ <i>C. mucronatus</i>  |
| <i>Pterinospecter</i>   | ✓ <i>C. indenta</i>     |
| ✓ <i>E. lucida</i>      | ✓ <i>S. perplana</i>    |
| <i>C. botteri</i>       | ✓ <i>Favosites</i>      |
| ✓ <i>N. concinna</i>    | ✓ <i>S. audaculus</i>   |
| ✓ <i>J. acuminatus</i>  | ✓ <i>A. decussata</i>   |
| ✓ <i>M. concentrica</i> | ✓ <i>S. granulosa</i> ? |
| <i>C. elongata</i>      | <i>Pal. hamiltoni</i>   |

5' 5" - 10' 10" above cascade the shales are soft, have concretions and numerous fossils like those listed above.

*N. concinna* is present, also *Pholidops* <sup>ham</sup>  
*P. rana* and *A. umbonata*. At this falls there was a bank of shale of the kind at this level over 750' high



Fossils become continuously less abundant as progress is made above the hard band. *A. umbonata* was most abundant for several steps. At about 25' above the hard band a cephalon of *H. dehayi* was found. Between 35-35 + 40-40 above the hard band the following were found:

<i>B. sulcomarginata</i>	<i>P. rana</i>
<i>Ceratopora</i>	✓ <i>M. subolata</i>
<i>Pol. concentrica</i>	
✓ <i>S. arctostriatus</i>	
✓ <i>A. spiniferoides</i>	

None of these is abundant.

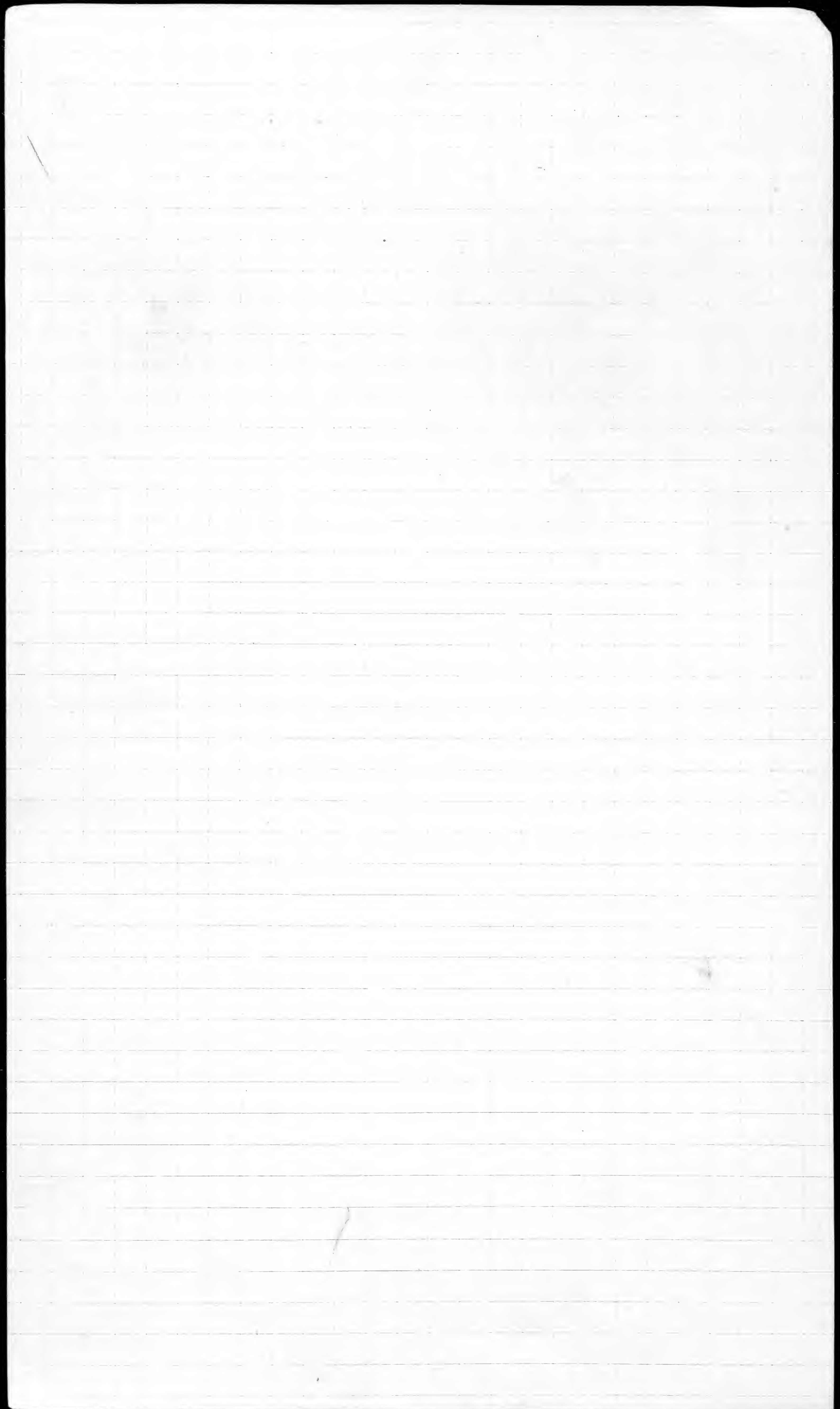
Between 40-40 and 55'-55' a few of *Bembexias* and *P. discoidulum* were found. The shale at 50' above the hard band is a soft blue-grey, none calcareous shale with little or no grit. Small clumps of *Ceratopora* were occasionally noted. Concretions have been numerous in the 60' of shale traversed from the hard band and they are of all shapes.

Just below the falls between 55'-55" + 60'-60" were found in a dark shale:-

<i>Orthoceras</i> sp.	✓ <i>H. oblongatus</i>
✓ <i>L. laura</i>	<i>B. lida</i>
✓ <i>H. triquetra</i>	✓ <i>P. spinulicosta</i>
✓ <i>S. pectinatus</i>	

The top of the falls is at 80-80 and is caused by a concentration of *Ceratopora* in the shales. *B. sulcomarginata* and *Pol. marginata* were found here also *P. flabellum*. The reefs were in three or 4 layers and almost made up the mass of the rock.







At 100-100 - *M. pygmaea*, *F. larva*, *S. murina*,  
*S. crataegum*, *P. fragilis*, *Parenka* sp.,  
*P. discoides*, *M. oblongatus*, *M. triquetus*,  
*Grammysia* 2 sp.

From 100'-100" - 165'-165" a considerable fall  
prevents collecting. At 165'-165" were found  
*E. itys*, *M. randalli*, *E. regulata*,  
large *S. pinnifera*, *M. subalata*, *C. scitulus*,  
*P. discoides*. The shale here is dark  
grey and rather gritty, weathering to a  
light grey. At 170'-170" *C. scitulus* is very  
abundant. Other fossils are *M. triquetus*,  
*Leiopteria* sp. The shales here were very  
hard.

At 190'-190" the shales are dark and  
rather hard. Fossils noted here  
are *M. oblongatus*, *C.*, *A. umbonata*,  
*S. truncata*, *B. sulcomarginata*,  
*P. discoides*, *M. bellistriata*, *P. fragilis*,  
*M. triquetus*.

Fossils at 195' are -

*M. mytiloides*  
*Leiopteria* sp.  
*P. discoides* c  
*M. randalli*  
*L. macroptera*

*C. setigerus*  
*Pal. concentrica*  
*B. sulcomarginata*  
*Parenka* sp.  
*Neophritoceras* sp.  
*M. pygmaea*

Between 210'-210" and 215'-215" in dark  
shale the following were seen.

*L. densa*  
*M. bellistriata*  
*S. perplena*  
*C. macronotus* c  
*C. scitulus*  
*S. pennatus*  
*C. boothi*  
*M. concentrica*  
*M. concinna* c  
*S. andaculus*  
*P. flabellum*  
*P. roma*

*M. oblongatus* c  
*M. arguta*  
*C. bellistriata*  
*A. spiniferoides* c  
*C. indurata*  
*Orthoceras* sp.  
*M. subalata*  
*M. pygmaea*  
*P. bellata*  
*Lox. hamiltoni*  
*S. truncata*  
*M. mytiloides*



At 210' is a row of concretions and calcareous matter with many *N. arguta*. The rock here is also filled with *C. scintulus* and large *Spirifers*, *B. sulcomarginata*, *Leptopteria*, *Schuchertella*. This concretionary layer forms a cascade.

Above the concretionary layer the shale is finer, also concretionary & in addition to the fossils listed on the previous pages has *R. vanuxemi* & *S. minutus*.

The shales at 225'-225" have many concretions and in places reptaria. Small bands or lenses of ls. are composed of poorly preserved fossils, otherwise the shale is dark blue grey and slightly gummy.

*S. penetratus*, *C. setigera*, & *C. concretionis* are noted here. Pyrite is present in small concretions.

About 250'-260' above the lead band the shale becomes quite soft & fissile. A mass of ls. at 260'-260" has *S. perplan*, *C. scintulus*, *R. vanuxemi*, *Palaeonilo* sp., *Ostracod* sp.

The shales at 250'-250" are very thin bedded, calcareous and sandy. They are quite unfossiliferous and do not appear to have any fossils. At 275'-275" is the top of the falls. Thick beds of shale (or thin ss?) are interbedded with thin bands of calcareous ss or ls. One of these calcareous ss. bands was 1 1/2" - 2" thick.

At 295'-295" these shales tower up about 50'. Large numbers of boulders with corals and many <sup>low</sup> corals are also found at this level.



23/11



The shales at 305' <sup>305'</sup> are soft and blue gray breaking into small chips. I regret that from above had I known at about 325'-325" they were exposed for 20 or more feet.

### Remarks on the Bear Mtn. Ravine

Hand leveling in this ravine was not very successful as indicated by the discrepancy of my measurement with Luther's. His level is apparently good only for short sights. Where fossils of kinds not seen in the Cardiff become abundant is the dividing line between that formation and the Skaneateles. Luther draws his line at 20' below the hard band. It seemed to me that this came about still lower down. The shale for 2 or three feet below the hard band contained many fossils and that above it for ten or 15' feet also. It seems to me that the hard band with the accompanying shales are a distinct zone. Fossils become less and less abundant for a considerable distance above this zone. Throughout the remainder of the section typical Skaneateles fossils alternate with new forms in various layers. The *Syringopora* reefs forming fossils were interesting. Another interesting layer is the concretionary layer with accompanying shales about 230' above the hard band. This layer had many *C. scitulus* and in the concretions *N. alga* was very abundant. The shales above had fossils like the



New York fossils but probably <sup>11</sup> do not belong there <sup>11</sup>. The upper layers were soft shales but intervening between the soft shales and the Nyassa zone came the thin-bedded calcareous arenaceous shales.

I traversed the creek up to the upper highway and this was about 360' above the hard band and soft shale was still exposed for about 20' just below the dilapidated bridge. I continued on for about  $\frac{1}{2}$  mile up stream but found only glacial material which is very thick here. However for the whole distance, until the ravine was abandoned I noted blocks, slabs, and boulders filled with horn corals so as to make a "coral conglomerate". This showed the source of the corals to be beyond the road, namely west. I left the ravine between the first and second highway crossings. I believe the Ludlowville & Elmore contact should cross the stream between the two highways. <sup>Wrong</sup>

As to the levelling: - A total of 460' <sup>1st</sup> by the contours occur between the upper road and the lowest exposed rock. I gave up hand levelling at 330-330 which brought me just to the road. Thus 357 $\frac{1}{2}$ ' existed between the hard band and the highway bridge. Add to this 87' to the top of hard band and the total is 444' for the distance traversed in the ravine. This is only 16' difference in 460.



Sept. 9.

## Bear Mtn Ravine

Hand looking and collecting from top of high falls. As I recall, but the bottom of this 65' falls (the one at creek not scale) *L. laura* and *M. subulata* were found.

On the top of the falls was seen *L. laura*, *M. subulata*, *C. scintulus*, *S. arctostriatus*, *B. lida*, *P. sectifrons*, *H. aelis*, *Aviculaperta*, *O. micromatus*, *O. parvula*, *N. oblongatus*, *N. triquetus*, *S. crocatus*, *A. boydii*, *N. pygmaea*, *N. belletristia*, *Strombosia* *concolor*, *P. patulus*, *P. discoidemus*, *S. granulatus*, *I. submarginatus*, *Cyrtolites* sp., *M. mytiloides*, *A. decussata*, *S. minutum*, *O. undulata*, *Parasola* sp.

The rocks here strongly resemble that at the lower part of the West Gym. concretions are numerous about 8' above the top of the falls. They are like those seen in the West Gym. The fossils are like those in the stream debris at Pratt Falls.

3 hand-level steps above high falls the shale is harder but sandier and *Spirifer* are very abundant. Here was also seen *S. bivalvatus*, *S. crocatus*, *N. oblongatus*. The rock forms a ledge. *P. discoidemus*,  
21' above *C. scintulus*, *P. discoidemus*



About 21 or 22' above the high falls there are some rather coarse sands but only in a thin bed which is probably not continuous. Between here and 27' the shales have very few fossils. *N. bellistriata* being the only one seen and they are argillaceous at 27' having very little grit in their makeup.

Between 8 & 9 steps comes the top of the first falls above the high falls. Here the rock is becoming coarser and more fossils are coming in. They are not abundant but the following were recorded.

*Myxocela* - common

*Strombopora* sp.

Snails common

*N. oblongata*

*M. mytiloides*

This assemblage is similar to those found in the blues & coarser stones between the top of the New Syn & the Fertilizer Stock farm horizon.

Between 9 & 11 the shales become sandier. *Leiopteria*s are seen and a few *Myxocela*s and *Macrochilus*. ~~Also~~ Also concretions become increasingly abundant and many of them contain *Myxocela* sp. or *Leiopteria*s. The shales containing the concretions are also very fossiliferous and a good list may be seen on map.



other notes on this ravine.  
*A. spiriferoides* is common in the  
 shales. Also in the shales:-

*Pal. concentrica*

*C. boottii*

*C. bellistriata*

*C. mucronatus*

*Ostrea* sp

*P. rana*

*P. lirata*

*M. subolata*

*M. arguta*

*P. patulus*

*B. lyra*

*H. lirata*

The concretions in the layer at  
 60' above the high falls abound  
 in Nyassas. About 12' above stream  
 bed and just below the concretions  
 a layer with *C. mucronatus*, large  
 spirifers, *C. scitulus*

*P. flabellum* was noted in this  
 layer

The concretions are a blue grey ls  
 very hard & very pyritiferous

This Nyassa band was seen  
 1000 paces downstream from the  
 highway bridge.

At 12 the concretions are common  
 & at 13 a distinct line of them can  
 be seen

On the stream at the bend  
 between 12 & 13 the concretions form  
 a small cascade. The shale  
 about them is calcareous and  
 nodular. It contains *P. flabellum*

*Platyceras* and many bryozoa  
 The concretions are irregular in  
 shape.



Between 14 + 15 in the soft shales were seen nests of *A. umbonata* with *P. canis* and *A. spiriferoides*.

At 16 there are shell ls. lenses in the dark fissile shales and above these the shale is dark and fissile and continues up for many feet. This is probably where the *Stenonotus* ends. *S. pennsylvanicus* + *P. vanuxemi* are common in these lenses. *Myas* ranges at least as far as 15 1/2 steps or about 82' from top of falls.

Between 18 + 19 fissile shales + ss. The concretionary + flat ls. lenses went under between 16 + 17. The shale is soft + fissile and has thin ss lenses, but above flaggy ss layers, thin, come in.

Between 23 + 24 shaly layers of ss come in, divided by layers of soft shale almost fissile.

The bridge is at 32 steps above the high falls.





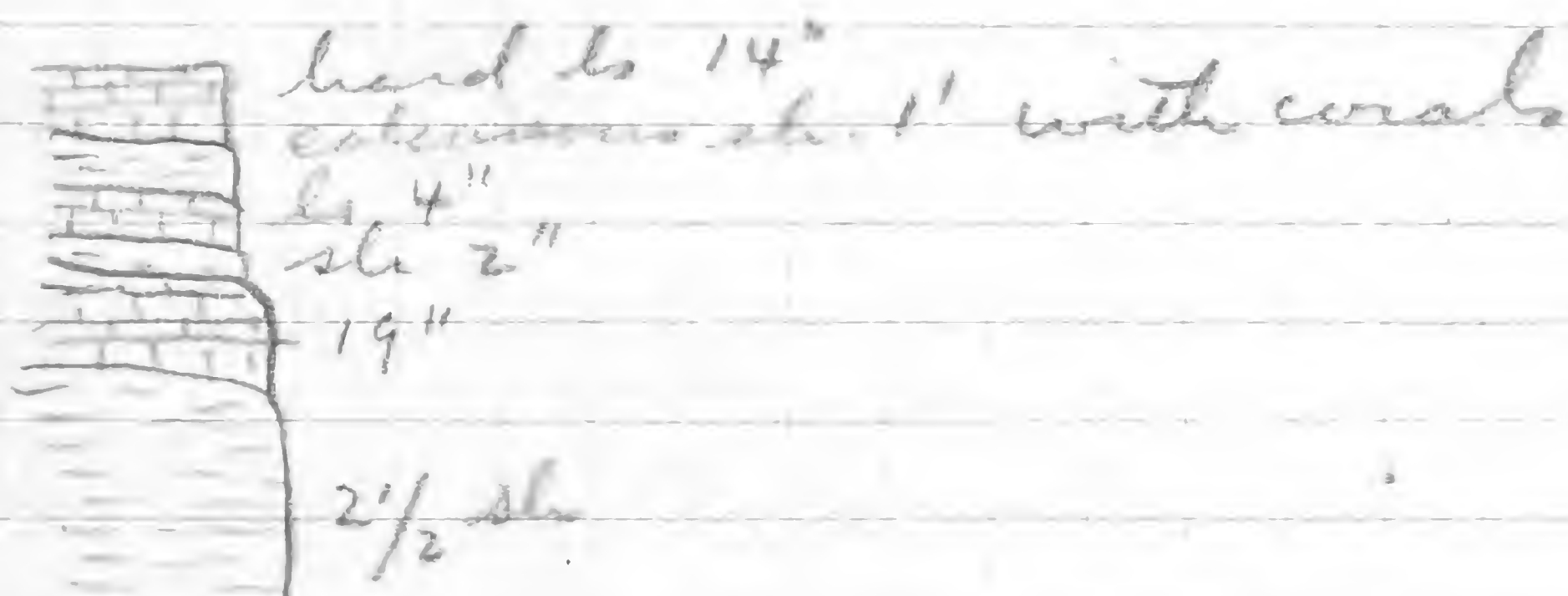
Winter 16'

1250 Road intersection



## Centerfield ls. at Blossom

On the soft shale is a ls.



## Fauna

*Atrypa reticularis* 19" up

*Lichenaria* \*

*C. boothi* var *collitales*

*C. boothi*

*P. rana*

*P. rowensis*

*A. decussata*

Coelothrophylloid corals

*Heliothyllum*

*Favosites* heads

*Camerozoechia* common about 1' up.

On the shale are 19" of ls. that break readily under the hammer and crumble to large fragments naturally. These have *Camerozoechia*, bryozoa, *Atrypa*, *Cyphacera*, *Phacops*, but no corals. *R. rowensis*. The *Atrypas* are very small *P. rowensis*, *S. concava*, large *Dictyonella* *E. lucina*?



In the coral bed was noted a large Pelecypod that may be a *P. princeps* or *L. macroptera*.  
Fauna of the sh.

Corals, cup + compound

*S. demissa*

*P. rana*

*A. decussata*

*A. spiriferoides*

This ls. may represent a thickened equivalent of that found on the Lake Shore with *P. iowensis*, altho the fauna is greatly changed. This however may not be so. The examination of this locality took place just before dusk Monday evening and was therefore not thorough. It should be revisited.



## Blossom Revisited

About 2 1/2' of softish, shaly, dark grey in color with a concentric structure and few fossils. Fossils:

*A. subtruncata*

*A. dipodius*

*A. blunellii*

*P. fragilis*

are all found in the lowermost beds, but the shaly lower band (more calcareous) contains *A. subtruncata* and *A. dipodius*? being abundant. In the 2 1/2' of shaly to 18" of ls. that softens into shales. This contains many fossils.

*A. cupressus*

*A. dipodius*

*E. luna*

*E. boothii*

*P. insculpta*

*Lichenolia* sp.

*Modiolus bryoz.*

*Conotoculites*

*S. conus*

*E. luna* (thin)

*Platyceras* sp.

17-18" ls. *A. cupressus*  
17" sh. *A. dipodius* (?)  
8" ls. *E. luna*?  
18" "  
2 1/2' soft sh.

Then follows an 8" ls. bed hard and grey. It contains:

*O. claria*

*A. cupressus*

"

The 10" sh. with many cupressus

Then follow 17-18' of hard variable ls. in places it is exceedingly hard & flinty, in others shaly.



Section below dam at Blossom  
6' of rock exposed - lower 2 1/2' belongs  
to the Shinarump which here is like  
a soft dark grey shale weathering  
to small fragments. It has *S. pennatus*  
*A. umbonata*, *C. mucronatus*. It is  
somewhat calcareous.



1927

July 23.

Bowen Brook

Ludlowville

10-15' of the upper beds, not very well displayed, usually in the stream bed where the shale is greatly disintegrated. About 400 or 500 paces downstream from the bridge is a rather good exposure in a vertical cliff of 8-10'. Fossils found in this upper shale are:-

*A. spiniferoides* cc*S. pennatus**T. carinatus*

Small cup corals.

Tichenor

Not well shown, but about 100-150 paces downstream the contact with the Lud- is seen. Here there are 15" of hard grey ls in which the fossils stand out in relief. A somewhat shaley ls must be present below this 15" band, that contains corals and bryozoa, to judge from the fragments lying about and from the large *Helicophyllum* cup-corals. None of this stone was seen in place. Fossils observed in this band are:-

*C. subcaespitosum**C. coronatus**Cyathophyllum*

many Bryozoa

Huge crinoid stems

*Serracoccyus* plate?*D. lineatum**P. rana**R. penelope*Large *Spinifers*



On this layer is another 15" thick somewhat shaly in places but a good half of it is rather hard ls. Fossils were not seen in this stone in great abundance but *A. spiriferoides*, *Camarotoechia*, *D. lineatum*, *P. rana* and *S. perratus* were seen. The exact thickness of this could not be measured. 30 paces up from the highway bridge considerable shale comes on the ls and it is thought that here the Moscow begins.

### Moscow

37 paces from the highway bridge this shale becomes about 9"  $\pm$  1' in thickness and is quite fossiliferous. This shale has the same appearance as that on the Cincinnati stone at Red Gate. It is a rather soft shale crowded with well preserved crinoid stems and more poorly preserved fossils. The shale itself is very slightly calcareous. In it also are lenses of small size and irregular masses of hard crinoidal ls. The fauna observed there follows:-

- |                                           |                          |
|-------------------------------------------|--------------------------|
| <i>S. perplana</i> r                      | <i>Productella</i> sp.   |
| <i>C. indenta</i> re                      | <i>C. bellistriata</i>   |
| <i>A. decussata</i> c                     | <i>S. macronotus</i> ?   |
| <i>Lingula</i> sp. re                     | <i>Ambocoelia</i>        |
| <i>R. fimbriata</i> re                    | <i>Crin. hamiltoniae</i> |
| <i>C. vicinus</i> re                      | <i>S. inaequistriata</i> |
| <i>S. perversa</i> re                     |                          |
| <i>D. lineatum</i> r                      |                          |
| <i>C. coronatus</i>                       |                          |
| <i>S. perratus</i>                        |                          |
| <i>C. setigerus</i>                       |                          |
| <i>I. exigua</i>                          |                          |
| <i>R. pelolope</i> ?                      |                          |
| <i>E. lucina</i> (var <i>perforata</i> ?) |                          |
| <i>P. rana</i>                            |                          |



Between 45 + 90 paces there are no rocks exposed. At 90 paces the shales are soft and argillaceous. In a layer here with many crinoid stems were found: -

<i>S. pennatus</i>	<i>M. concentrica</i>
<i>S. andaculus</i>	<i>I. exigua</i>
<i>D. sculptilis</i>	<i>Bryozoa</i>
<i>R. variegata</i>	<i>P. carinatus</i>
<i>C. indenta</i>	<i>Cryptonella</i> (crushed)
<i>Leiopteria</i> sp.	<i>Trachypora limbata</i>
<i>Actinopteria decussata</i>	<i>P. undosus</i>
<i>Platyceras</i>	<i>L. orbiculatus</i> ?
<i>S. inaequistriata</i>	
<i>Aviculapecten</i> sp.	

100 paces

From 117-135 paces no rock but at 135 paces about 20" of rock are exposed. Here in a layer with much crinoid material was found large *Actinopteria* with a height of  $3\frac{1}{2}$ "

<i>S. andaculus</i>	<i>R. variegata</i>
<i>R. penelope</i>	
<i>Schuchertella</i> sp. ?	
<i>A. spiniferoides</i>	
<i>M. concentrica</i>	
<i>D. lineatum</i>	

The fossils appear to be localized in these patches for the shales appear quite infossiliferous

At 221 paces there are about 50 ft of shales exposed horizontally. These have a blocky character and are somewhat calcareous; they may be a leached calcareous band. A large globella of *Phacops* was found here.



At 400 paces upstream a 20' bank exposes the Moscow but collecting is not possible in it as it is greatly covered by dirt. At this point in the stream debris a *Planoliticium* was found.

At 450 paces in the bank in a concretion the following were observed:-

<i>A. spiniferoides</i> (higher shoulder than <i>Lud. form</i> )	
<i>J. exigua</i>	<i>S. pennatus</i>
Crinoid stems	<i>J. bellulus</i>
<i>Cystina hum.</i>	<i>C. coronatus</i>
<i>Stictopora</i> ?	
<i>Camarotoechia</i> sp.	
<i>Ambocoelia</i>	

The shale here falls to a blue clay. From about 500 paces to 594 a big bank exposes about 10' vertical of bluish grey shales, but collecting is not good here as the <sup>blocks</sup>interstices of the shale have become filled with soil from above. At 594 paces however there begins a long exposure in the stream bed. Here are found well preserved and fine *J. carinatus*.

<i>J. carinatus</i>	
A <i>Terebratulid</i>	
<i>S. pennatus</i>	<i>Schuchertella perversa</i>
<i>N. concinna</i> - with spines	<i>H. debayi</i> 2 specimens
<i>Cyconatus</i>	<i>C. boothi</i>
<i>P. rana</i>	<i>C. bellistriata</i>
<i>Camarotoechias</i>	

At 685 paces in the bed of the brook was found a patch of small areas in which *J. carinatus* and *N. concinna* were crowded in the rock, and in one concretion *J. carinatus* makes up practically the whole rock. From here and to 712 paces the following fossils were found:



*P. stylopora* - very large & with huge cups.  
*J. carinatus*

*N. concinna*

*O. undulata* - 1st. discovery of this.  
 The specimens of *J. carinatus* are covered  
 with *S. angulatus* & *Hederella*.

At 750 paces the shales <sup>are</sup> crumbly under  
 the hammer as they have done from  
 600 paces up. Here is a concretion  
 was found *J. bellulus*. *J. carinatus*  
 continues to be the most abundant  
 fossil. Others found here are *Camarotoechia*  
*sp.* and *S. pennatus*.

At 765 paces there was a local concentration  
 of *Camarotoechias* & the ever present  
*J. carinatus*. Also *C. boathi* and *C. coronatus*.

At 825 paces there is a continuous band  
 of ls. that crosses the bed of the stream &  
 forms a 4' cascade and a flat in the  
 stream bottom. In the shale just below  
 this ls. were found:

*C. bellettilata*

*J. carinatus*

*Camarotoechia*

*S. pennatus*

*J. uniaangularis* ?

The limestone is 5-6" in thickness and  
 consists of shaly ls (ls that breaks in  
 plates & contains considerable clay in its  
 make up. and harder concretionary  
 masses in the same bed. This stone  
 must be the same as that seen  
 in Cozenovia gorge above the Tichenor  
 & in Murder Crk. above the Tichenor  
 & at 18 mi Crk. Few fossils were seen  
 here and they are

*J. carinatus*

pentagonal Crinoid  
 stems.

*S. angustatus* ?

*C. coronatus*

*S. pennatus*



At 935 paces blue shales are again prevalent. These have large calcareous concretions in them which in turn contain small black concretions. The fauna here is:-

A large *Spirifer*      A *Pleuronomaria*  
*S. pennatus*  
*C. coronatus* c  
*G. carinatus*  
*A. spiriferoides*  
*P. lanceolata*  
*C. brothi* var *collatales*  
*Gammysia* *liata*  
*P. muta*  
*B. beda*

In the bed of the brook, just in place were found there 2 cup corals & a *P. stylopura*.

At 1000 paces is a large exposure, about 15' vertical, however not good for collecting. Along the bed of the brook here is a line of large spherical concretions in the shale in the line of the concretions and included in the bottom half of them fossils are numerous as follows:-

<i>P. rana</i> c	<i>C. bellistriata</i>
<i>R. vanuxemi</i>	<i>A. spiriferoides</i>
<i>C. scitulus</i>	<i>Spirifers</i>
<i>Schuchertella</i> sp.	A <i>Terebratulid</i>
<i>Orthoceras</i> sp. with	<i>Hedrella</i>
<i>Strophomena</i>	<i>S. andaculus</i>
<i>S. pennatus</i>	<i>Chaetetes</i>
<i>Stylopura</i> ?	<i>A. umbonata</i>
<i>P. muta</i>	<i>Aviculopecten</i>

Small black concretions.

At 1400 paces about 15' of shales are exposed but they are not accessible for collection.

At 1470 a similar number of feet



of shale is exposed the lower 2' of which abounds in *Ambocoelia* cf *umbonata*. *Pholidops* *bram* was also seen here.

At 1665 paces about 9' above stream level the Genesee is exposed.

At 1925 paces the Genesee crosses the stream.

At 1859 paces there is a small outcrop of rock. Concretionary ls. in the stream bed about 6" above H.O., then a lens of pyrite 2" thick then patches of Genesee in the hill slope.

Genesee ? thickness  
2" pyrite  
6" subsection

Fossils noted in the concretionary ls layer are:-

Fossils are not abundant here as only 1 specimen each of *H. oblongatus*, *S. pennatus* and *Chonetes* cf *unus* were found. All of the rock here at the contact is hard and calcareous.

A few steps farther upstream at the same horizon was found in a shaly stone was found

*P. yana* c

*M. concentrica*

*A. reticularis*

*C. boethi*

*S. pennatus*

*C. setigerus*

Pyrite - has many crinoid stems, fresh when moist, carbonized leaves that lie on them. Sometimes has black shale in it. No recognizable fossils seen.



At 1297 paces a small exposure of soft blue-grey shales yielded:-

*Rhipidomella* sp.

*A. spiriferoides*

*A. reticularis*

*S. pennatus*

*P. rana*

*Cyrtodictya* (*Stictopora bryzoa*) abundant

*S. arctostriatus* ?

*C. bellistriata*

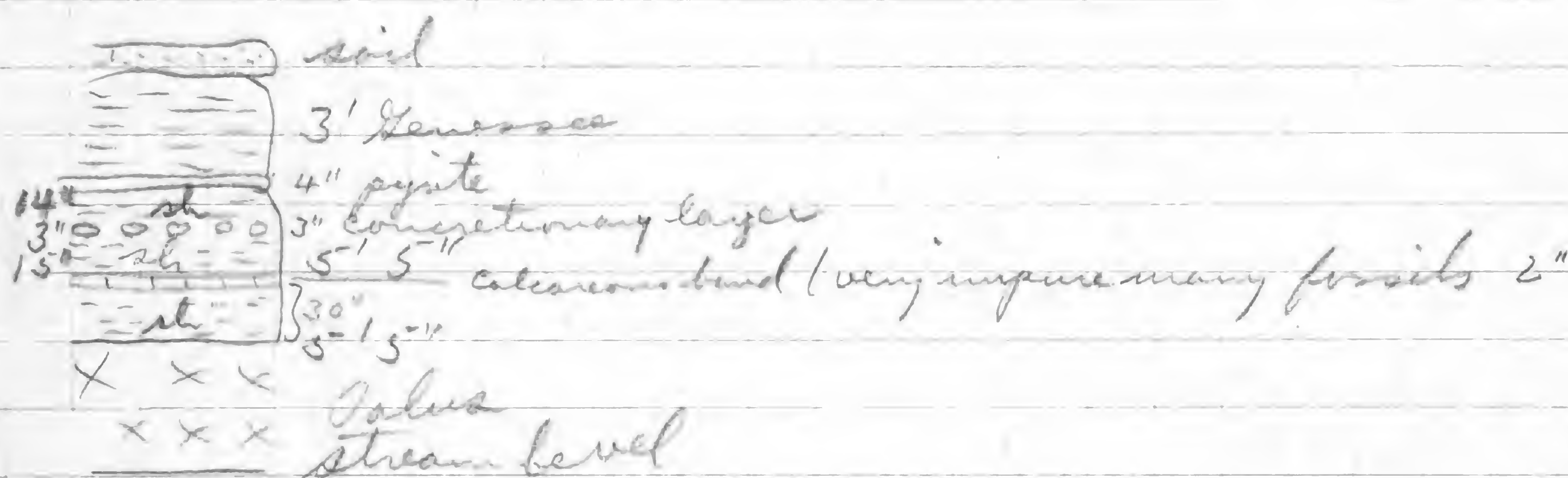
*S. junia* (?)

*C. setigera*

Small cup corals (*Amplexus*)

*P. rana*

At 1665 paces the following section was studied



Five feet 5" of rock are covered by talus and debris from above. Just above this are 30" of shale. Then an impure calcareous band with concretions and many fossils. Then 1' shale and a band of concretions probably represent the *S.* horizon seen at other localities. Another foot of shale is terminated by a 4" layer of pyrite which thins out within 10' in downstream direction. There is fully 25' of it exposed horizontally.



Fossils found here are:-  
in the shales

*P. pstulus*

*A. reticularis*

*C. coronatus* (loose)

*R. penelope* ("in debris")

in the 2" calcareous band:-

*D. lineatum* r

*A. spiniferoides* r

*A. reticularis* c

*R. fimbriata* r

*R. cyclos* r

*Platyceras* sp. r

*P. rana* c

*M. mytiloides* ?

*C. mucronatus* c

*M. concentrica* r

*S. perversa* c

Cup coral

This may, and is probably only a lens  
There is considerable pyrite in these  
rocks, mainly in the form of concretions

At 1000 paces in the soft shales above  
the concretionary band were found:-

*C. mucronatus* cc

*Ambocoelia umbonata* (præumbona?)

*C. scitulus*

*P. rana*

*Palaeoneils concentrica*.

These shales where exposed in a vertical  
bank are almost impossible to collect as  
the rocks merely falls to tiny fragments on  
the least blow and the pieces are coated  
with soil from above.

Below the concretionary bed a *Gosseletia*  
& a large *Spinifer*



1928

Lower Brook

July 26

dia. 1/2

*Polysiphonia*

Leaves entire

6. center

3.08 -

8 Pennates

*P. capitata*

C. L. G. 1000

14. *pena*

\_\_\_\_\_



*O. undulata*

At 125 paces the calcareous layer forms a 3' cascade in the stream bed. Fossils in the shale below the calcareous layer are:

*P. styliforme*

*T. carinata*

*A. ardens*

*P. rana*

*E. bothis*

*R. punctata*

*A. perforata*

Fossils in the calcareous layer 6' irregular concentration of *T. carinata*, *A. ardens* the large rather abundant in the concentrations but only between *E. punctata*.

975 in shale and concentration

At about 1110 a layer of concentrations is at stream layer. The concentrations are individual and are spaced from 0-3 or 5' apart they are about 1/2" across and about 1/4" thick. Between them is about 2' of calcareous shale abundant in small black concentrations and fossils. The concentrations also contain small black concentrations.

Fossils:-

*T. carinata* a

*C. coronata* a

*P. rana* a

*R. uncinata*

*R. punctata* a

*E. bothis* a

*H. concentrica* a

*Quartus* sp. a

*O. macrostoma* a

*A. depressa* a

*C. bellisima* a

*C. sinuata* a

*T. inaequalis* a

*Agnetus* a

*R. punctata* a

*P. modica* a

*P. rana*

*P. constructa*

*Periclyptus* sp.

Some of the black concentrations contain *Periclyptus* & shells of *Periclyptus* and *Lingula*.



*Arthrocoelia* is seen 1st about 6 1/2' above the contact. It becomes abundant at 11', continuing abundant to 16' 1/2" which examination could not be made. The *Arthrocoelia* becomes in about 7' above stream level at 11 50, base

11 50 - 14 70 - covered  
 14 20 - 14 70 - same, about 15' high. *Arthrocoelia* occurs at the stream level and for about 6' above.

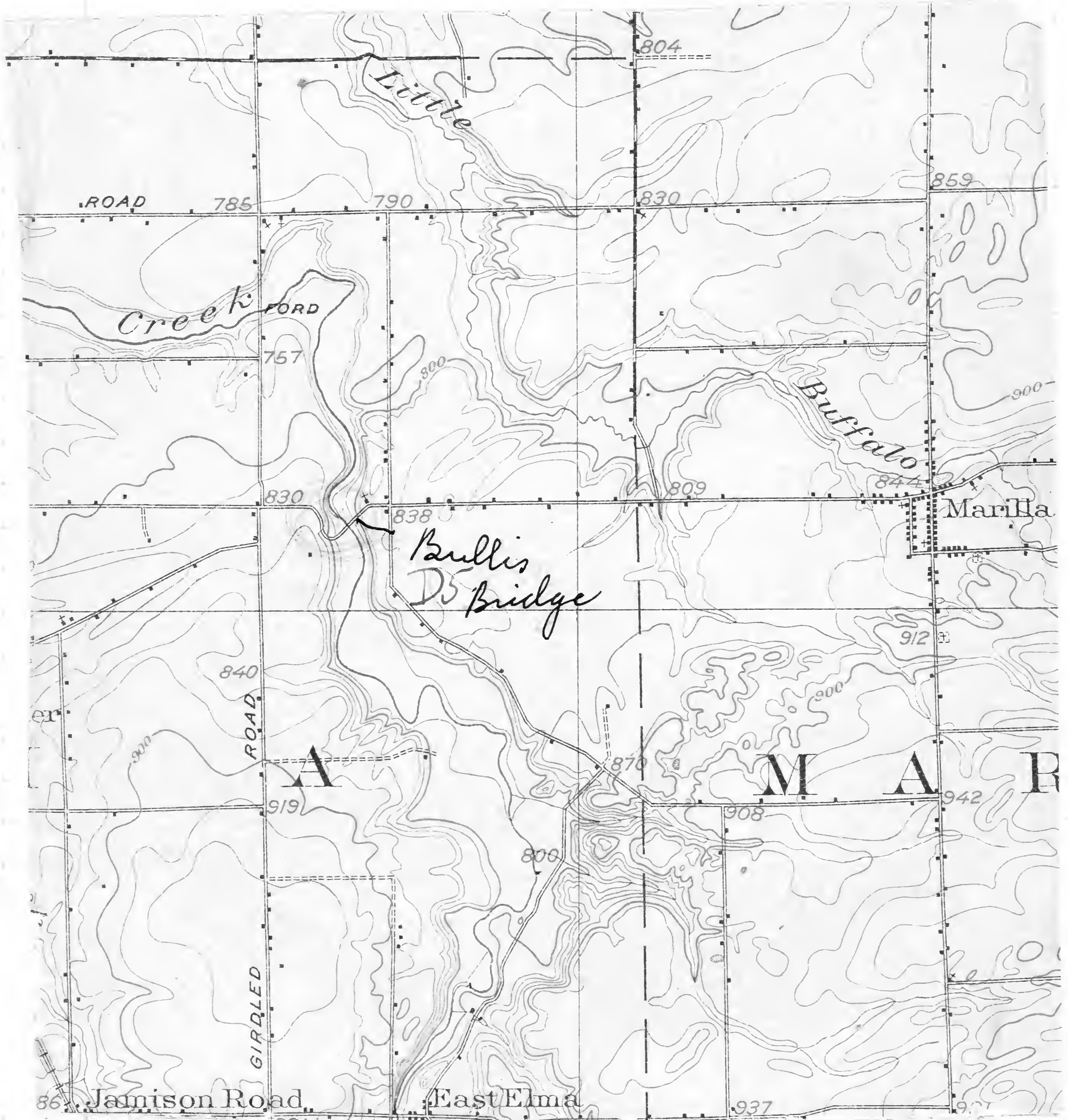
15 40 - 15 50 - about 10' high

17 30 - ditto as 15 1/2' to the base of the pyrite

19 20 - Pyrite is at stream level.



31a





Section Below Bridge

1. Grey silty shale limestone with much  
chert irregularly bedded. *P. bellerophon* fairly  
common.

*A. marginata*

The limestone is much more massive than  
than in upper bed.

*A. decussata*

*P. novae*

*S. pinnatifida*

*S. funebris*

*S. fimbriata*

*P. bellerophon*

*P. bellerophon*

*P. bellerophon*

2. 8' - 12' bed of light grey  
massive limestone. *P. bellerophon* common.  
At the falls the limestone is either replaced  
by decalcified clay or is actually chert. The  
being 12' at the falls.

*P. sculptus*



3. 11" - 14" of hard, massive crinoidal ls.

*U. pustulosa* a

*R. penelope*

*A. granulosa*

This bed also contains a *Strophomena* possibly. It is probably to be correlated with the base of L. above contains large heads of *Favosites* alds.

As thin at the top. *U. pustulosa* was only seen in this bed.

4. Shale 3" - Abounds in corals, one *Favosites* is about 3' in diameter. It is covered with small bases. The *Strophomena* above the coral head.



*C. subcaespitosa* c

5. Hard gray ls.

6. Shale and rock ls.

*P. caimatis*

*R. apiculata*

*A. subcaimatis*

*A. granulosa*

*P. hirsuta*

*S. planatus*

*Strophomena* (large)

*A. marginata*

*A. perplana*

*Strophomena*

*R. penelope*



# Ludlow section at Belle Forge





*Acropora*  
*P. complanata*  
*P. muricata*  
*P. nana*  
*P. pacificensis*  
*P. perfrons*  
*P. planifrons*  
*C. chinensis*  
*C. hyacinth*  
*F. bellinzeusi*

*Acropora*  
*P. complanata*  
*P. muricata*  
*P. nana*  
*P. pacificensis*  
*P. perfrons*  
*P. planifrons*  
*C. chinensis*  
*C. hyacinth*  
*F. bellinzeusi*

Section at falls.

Many of the corals in the line at a depth of 100 ft.





7. Hard, more crinoidal, gray ls.  
*T. marginatus* *C. cristatus*  
*S. pinnatus*  
*L. spina*  
*L. perflava* *Productella* sp.

Moscow section at the bridge

Shale at Delmar contact, less crinoid  
 stems and:

*T. limbata* *T. marginatus*  
*C. marginatus* *C. cristatus*  
*C. cristatus*

7 1/2' above the contact *Ambochia* abounds  
 There also was seen *T. marginatus*, *C. cristatus*

17 1/2' above Delmar is a fair gray ls.  
 possibly the *Strophomena* bed. At 6' 0" from  
 the bridge to 3' above stream level seen  
*C. cristatus*, *C. marginatus*, small crinoids, *T. marginatus*  
*T. limbata*, *C. cristatus*, *C. cristatus*

11' above stream level at 300 paces is  
 the *Strophomena* bed which appears to be  
 1' thick & is very poorly defined & has few  
 fossils. *Strophomena* is present however.  
*C. cristatus*, *C. marginatus*. Below it are  
 3 thin bands of ls.



The calcareous shales, even when fresh are a very dark grey but when they have been sun baked there a light tan on the surface. The railroad was followed south to the next exposure occurring about 1 1/2 miles from the starting place but no additional exposures were found.

The Railroad was followed down to the next road that crosses it but no additional rocks were found.

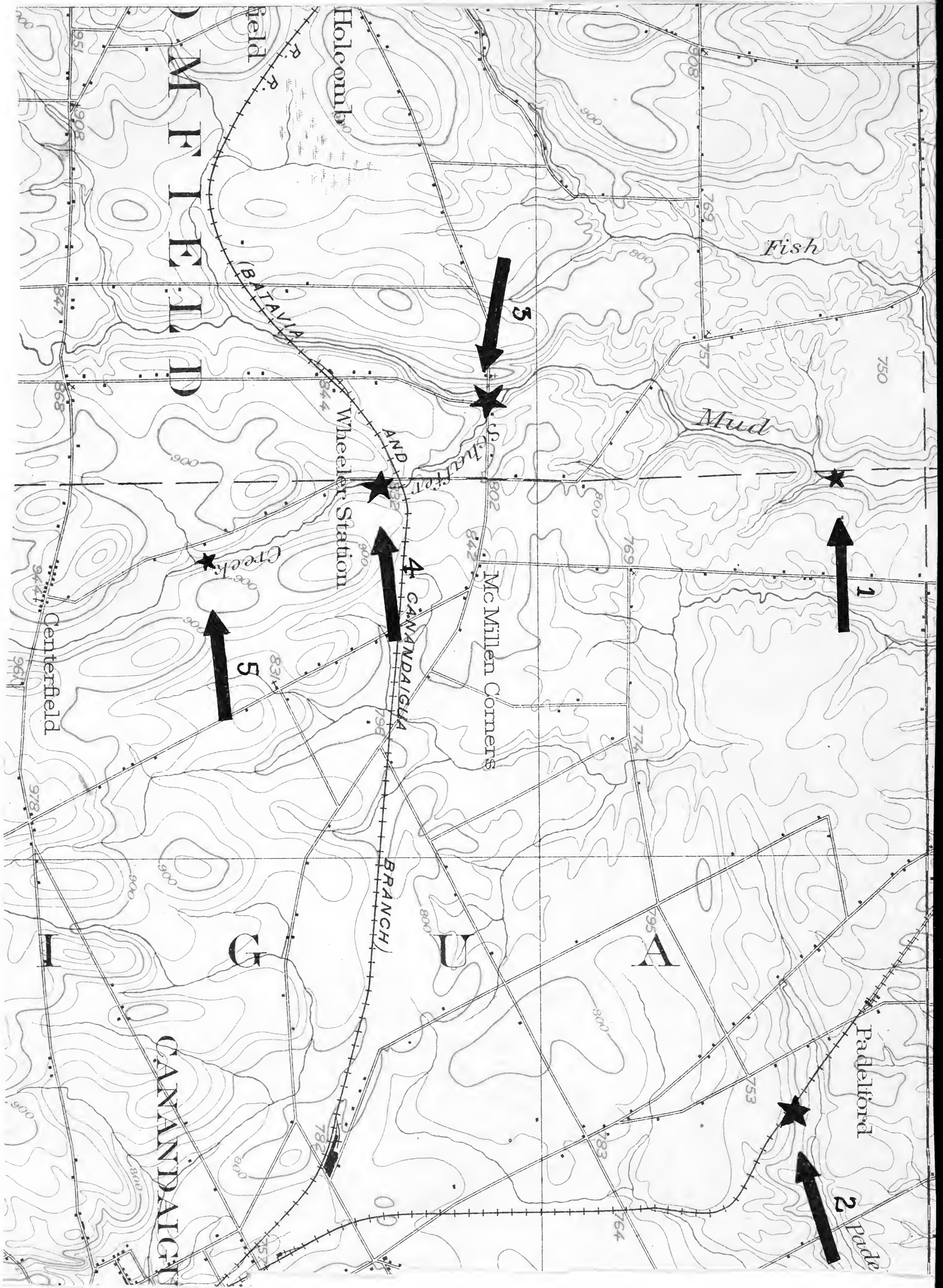
August 1.

Mud Creek.

At 3570 paces from the Onondaga outcrop near Monticello were found in the bed of the creek black shales and limestones cross bed with *L. binitaris*. The limestone was in place but the shales were in large blocks. A small and a small *Pterinea* were also found. This outcrop continues to ~~3663~~ 3663 paces.

At 4032 paces is a rather extensive outcrop about 15 ft vertical and exposed along the bed of the stream for fully 200 yds. These are dark grey or nearly black carbonaceous shales weathering to small fragments. Everywhere they found in *L. binitaris*. On the surface they are weathered to a light tan or grey. At 4200 paces in the bank about 10' above the stream are shales, highly calcareous and dark grey in section. They are not black in section. These weather on the surface to a light grey. Fossils were not abundant here.









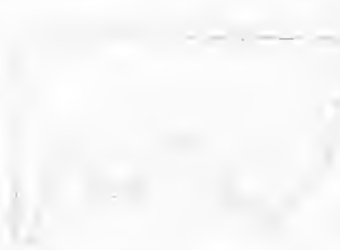






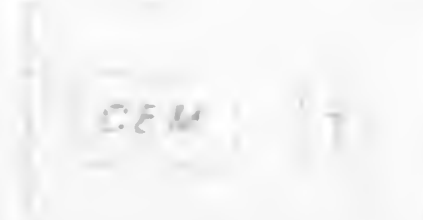





of the remaining area surveyed in Alaska has been published on a scale of  $\frac{1}{250,000}$ , but about 3,500 square miles have been published on a scale of  $\frac{1}{82,500}$ .

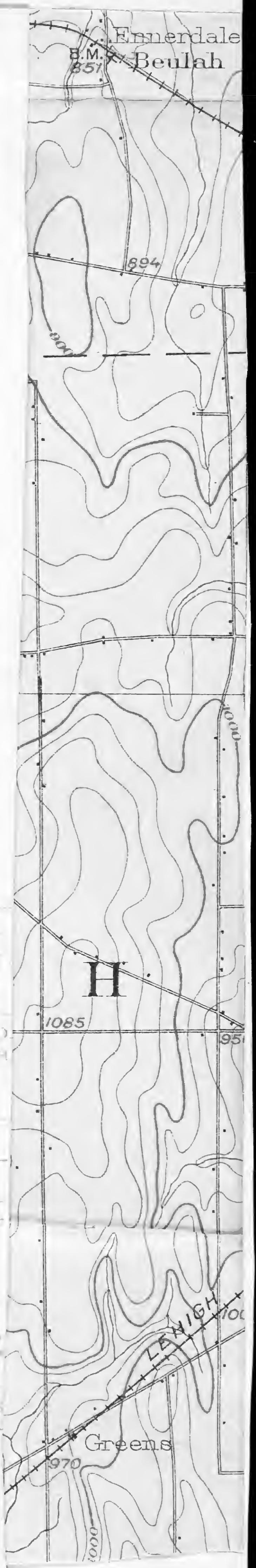
part of the Hawaiian Islands has been surveyed, and maps are published on a scale of  $\frac{1}{82,500}$ .

features shown on these maps may be arranged in three classes: (1) water, including seas, lakes, rivers, canals, swamps, and other bodies of water; (2) relief, including mountains, hills, and other features of the land surface; (3) culture (man-made), such as towns, cities, roads, railroads, and other features.

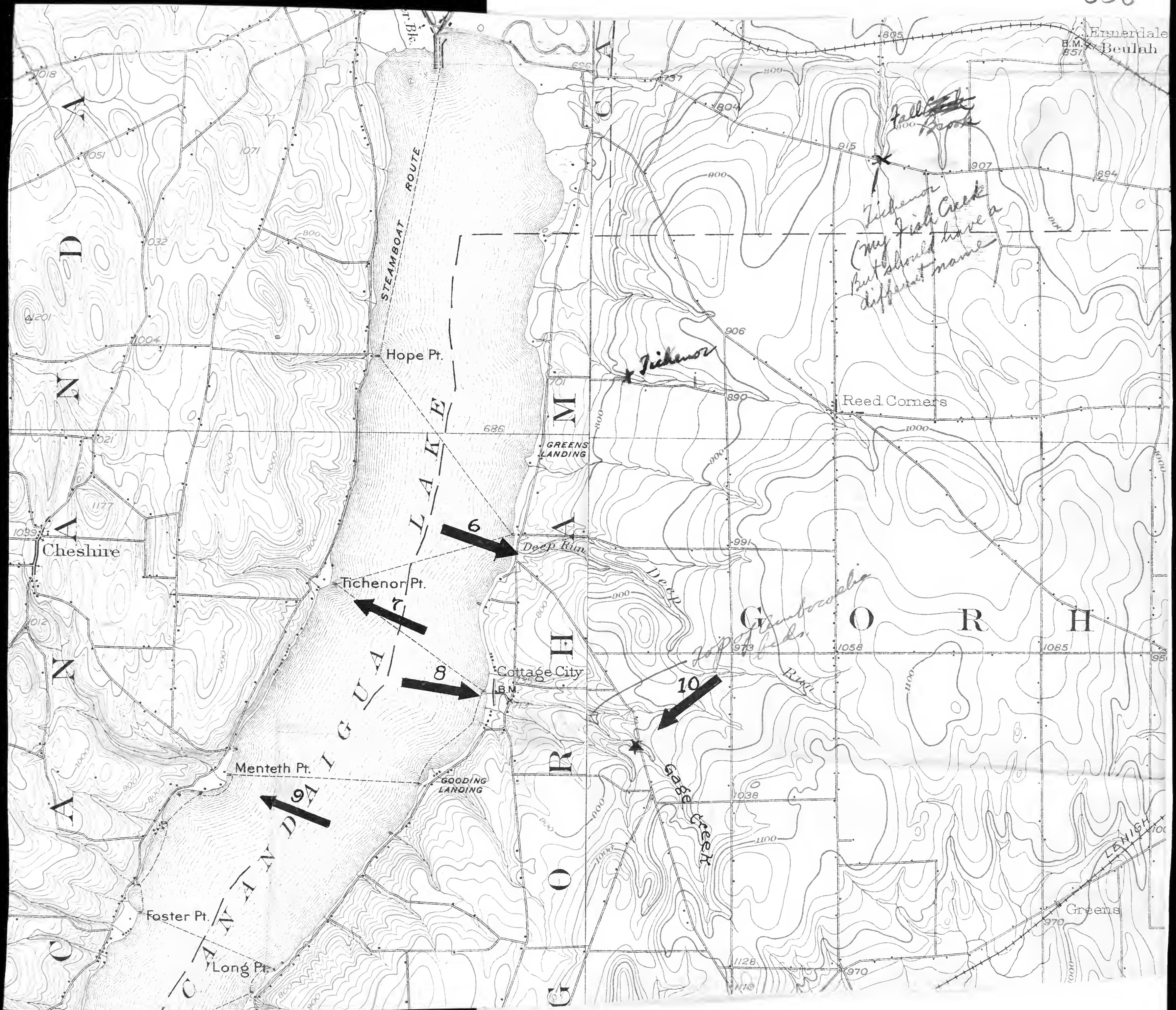
The conventional signs used to represent these features are shown and explained below. Variations appear on older maps, and additional features are represented on special maps.

				
City or village	Roads and buildings	Rough cliff dwelling	Metal road (dashed line on recent maps only)	Private road
				
Dam	Dam with lock	Canal lock	U.S. township and section lines and located corners	State boundary
				
Bench mark (black mark above number and black dot below lettering)	Cemetery	Control (black dot and number)	Coke ovens	Tank

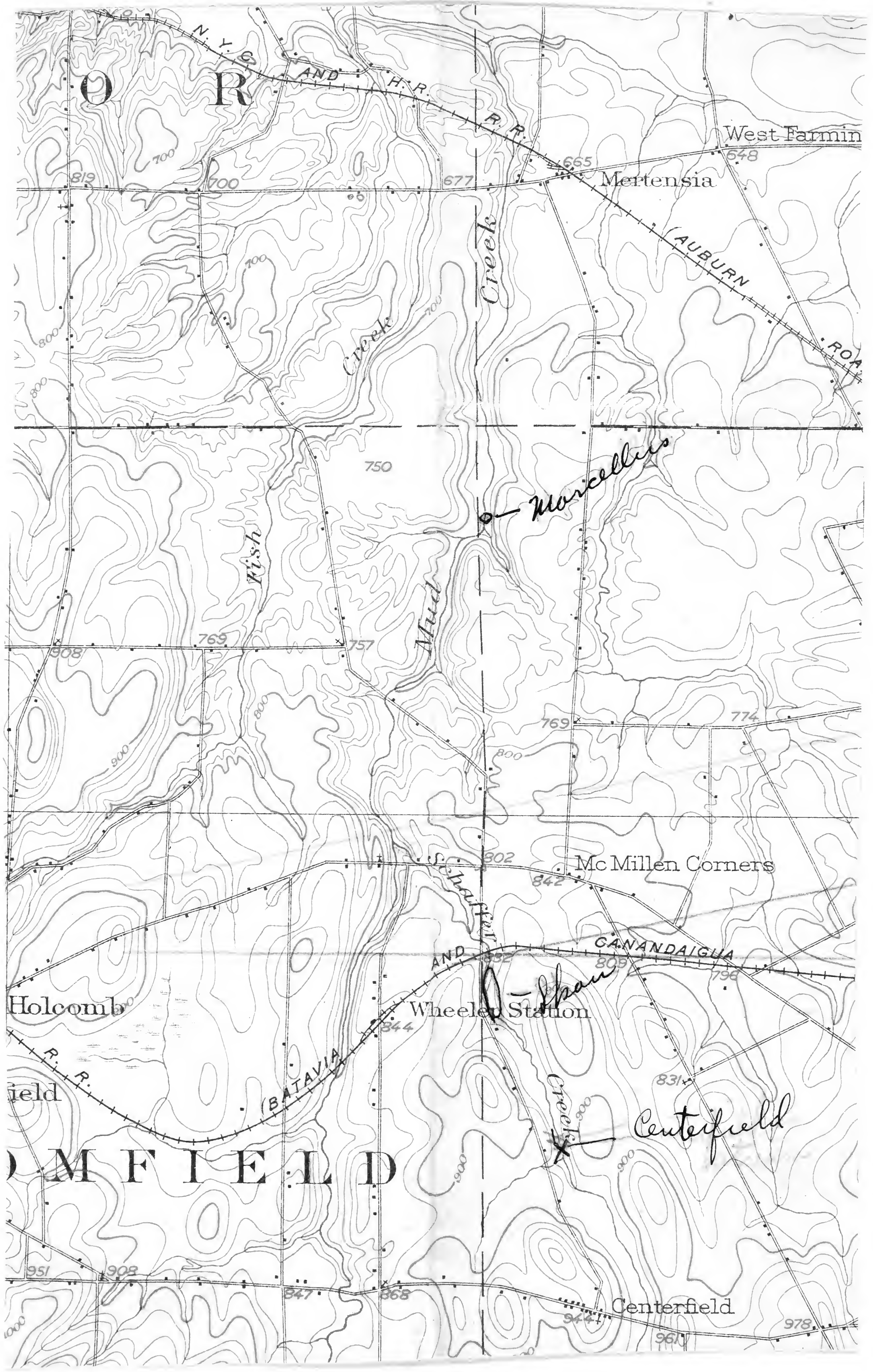
**RELIEF**  
(printed in brown)

















[illegible]



July 31.

Camandigua

~~Marathon~~ Candiff

Along the railroad cut at Padelford the first rock met is at 893 (200') from the railroad and highway crossing on the west side of the cut. Here the rock is a ls in layers (one layer noted) about 3" thick of hard gray (blue gray) limestone, resistant to the hammer and breaking with a conchoidal fracture. Most of the strata however is a hard calcareous shale that in the bed looks gray in cross-section. The shale weathers into slabs or large chips. In the lowest foot of beds such as the thickest of the limestones *L. truncata* is common. Other fossils noted here are:-

*L. linearis**L. fragilis*

890

893

37 1/2

*Lipteria* sp.

At 893 paces and about 20 paces W in a recent cut where the hill rises is a large exposure of calcareous shale. Here the rock has been subjected to the rigors of the sun & rain and the rock is broken into small chips, or thin flakes or in places as a flat slate. The rock gives ready effervescence with HCl. The shale splits into thin curved masses which break either into flat plates or very thin chips with smooth surfaces. Branches are fairly abundant but isolated. Here were noted:-

*Brachiolea retroflecta**L. linearis**L. laevis*?*E. regulata*?*P. discoides**C. irregularis*

The total thickness of the calcareous shale is 2'.



## Cardiff.

The Latham & Clarke, Canadagua report  
they map the Shantulas - Cardiff tract  
about 1/2" north of the confluence of  
Mud Creek with Shaffer Creek, yet on the  
last map state that the Cardiff is well  
exhibited at the juncture of the two  
Creek creeks.

Exposure at the juncture of Mud  
and Shaffer Creeks. The beds here are high  
columns at the juncture of the creek and  
may well be called Shantulas. As a rule  
they form a regular pinkish grey  
limestone. The strata are here  
subjected to weathering and then are  
disintegrated into small pieces. The  
beds here are planar and the surface of  
the beds here is disintegrated into small  
pieces. The stone may split into flat plates  
varying from 1/2" to 1" thick. The surface of the rocks  
is a light grey, even blue grey in places.  
The limestone is often very hard and some-  
times has a crystalline fracture.

Fossils:-

*O. minuta* 1 c

*S. truncatus*

*P. discoides*

*Leiopteria* sp.

*L. lenticularis*

*H. lenticularis*

*C. lenticularis*

About 200' south of the juncture of the  
creeks about 1/2" rock is exposed above  
the creek bed. The beds here are small slabs  
or plates. Here *O. minuta* is quite common  
3" from the juncture of the 2 streams  
are about 15' of the same rocks, little  
and calcareous. The Cardiff Shantulas  
boundary report is best seen here but  
not at the same place as above. The



*L. limitaris* is not abundant here

About 200' from the junction of the creek, and on Shaffer Creek about 15-20 of calcareous shales are displayed. These are not very fossiliferous but having a small *Trilobites*, a *Trigonia*, *E. angulata*?, *L. limitaris*

### Shaffer Creek

According to the list in Bull. 65. "These deposits are exposed in the bed of Mud Creek south of the highway bridge near the junction of Shaffer Creek, 1/2 mile north of Wheeler." The shales are very dark gray, not quite black, very calcareous and brittle. The rock is exposed for fully 200 yds in the bed of the creek and vertically from the bridge for practically 5-6'. These exposures show some of the fossils of the two creeks, and those noted above on this page. These brittle shales have in the upper portion of them exposure on the west side of the bridge ~~from~~ two thin layers of ls. which account for the calcareousness of the creek. The fossils here are small and few in number. The most abundant ones are that of a small *Pachydictya*, *Trigonia*, *Trilobites*, and *Actinopteria*. Other fossils are:

*E. subulatum*

*L. limitaris*

*M. trigona*

*Actinopteria* sp.

If the beds at the junction of Shaffer and Mud Creeks are Cordeff then the Cambrian contact must come between the junction of the two creeks and the highway bridge. There are a little *Trilobites* and *Trigonia* in the







1

2

3

4

5

6

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*L. curtum* ?  
*S. fissurella*

*C. mucronatus*

at 295 paces *L. limitaris* is very common. From 400-535 paces the stone is harder, probably because it is pebbly and some blocks of it can be found in the bank just below the road. The shale here is quite fossiliferous and has the following.

*L. curtum* oc

*S. fissurella* c

*Pagurula* sp. oc

*N. trigonata*

*P. discoides* oc

small bryozooids

*S. subulatum* oc

*Orthoceras* sp. oc



August 2.

## Shaffer Creek

The lowest shale observed seemed soft, some-  
what friable shale was dark gray in  
section, faintly gritty when  
grained with the teeth, giving  
a rather vigorous appearance  
with a brownish gray fracture  
and yielding a brownish gray  
streak. These are covered for  
about 4' vertically about  
one foot above the section.  
Below are quite friable and  
are the following species  
more found:-

Calymene sh. 6'

sh. 2' E

4" L.  
4" impure ls.

2" L. sh. - - - a

dark, soft  
7' shale with  
faintly pinkish

stream level

*L. fissurella* cc *Camarotoechia*  
*L. costata* cc *M. trigonata*  
*L. laeva* c *P. punctata*  
*E. irregularis* ? *C. atigera*

At about 2' above stream  
level the shale begins to  
become thin, friable, split  
into chunky pieces and  
not into flat chips. The  
fauna also changes. The  
*Calymene* and *E. fissurella*  
persist and there comes  
in the next 2':-

*P. spiniferoides* *P. congeria*  
*A. thickia* *P. oblata* cc  
*A. umbonata* c *C. suphis*  
*Camarotoechia* *Cyt. hamiltoni*  
*P. punctilifera*

This shale which becomes  
chunky fragments gets more  
and more friable till



of soft argillaceous ls. Then follows 3" of the same kind of shale which has corals, then 4" more of boulder ls. Then 2' shale abounding in fossils.

I have littered these beds from the bottom up and will attempt to get a fauna for each.

## Bed a

<i>A. spiniferoides</i> ✓	<i>A. reticulatus</i> ✓	<i>P. imbricata</i>
<i>A. imbricata</i> ✓	<i>C. sappho</i> ✓	<i>C. imbricata</i>
<i>P. oblata</i>	<i>C. imbricata</i>	✓ <i>P. concentrica</i>
<i>Pal. pinnata</i> ✓	<i>P. imbricata</i>	✓ <i>M. concentrica</i>
<i>S. dentatus</i> ✓	✓ <i>E. concava</i>	* <i>M. concentrica</i>
<i>P. rana</i> ✓	<i>Platysma</i> sp.	<i>Cyrtostoma</i> sp.
<i>S. pinnatus</i>	<i>E. corals</i>	<i>Bygonia</i>
<i>Chordea</i>	<i>Strophomena</i>	

The cup corals were noted only near the top of the bed.

## Bed B. 4" ls.

✓ <i>P. imbricata</i>	✓ <i>C. belluata</i>	<i>A. spiniferoides</i>
<i>C. sappho</i>	<i>Kenozoona</i> sp.	<i>Lichenaria</i> sp.
<i>C. reticulatus</i>	<del><i>C. imbricata</i></del>	<i>P. rana</i>
✓ <i>M. concentrica</i>	<i>D. lineatum</i>	<i>Kenozoona</i> sp.
<i>P. concentrica</i>	<i>A. imbricata</i>	<i>Platysma</i> sp.
<i>S. pinnatus</i>	✓ <i>C. imbricata</i>	✓ <i>C. imbricata</i>
<i>R. penelope</i>	<i>P. parvionensis</i>	

## Bed c

Shale + Shaly ls.

<i>P. imbricata</i>	<i>A. bogli</i>	<i>S. macronatus</i>
<i>S. pinnatus</i>	<i>C. corals</i>	<i>P. imbricata</i>
<i>Conocardium</i> sp.	<i>P. lineata</i>	<i>M. concentrica</i>
<i>D. sculptilis</i>	<i>C. corals</i>	<i>R. penelope</i>



## Bed D. 2' shales

<i>Lophosoma</i> Ham.	<i>C. lewathi</i>
<i>A. uterulus</i>	<i>S. concava</i>
<i>P. ...</i>	<i>T. ...</i>
<i>H. ...</i>	<i>H. ...</i>
<i>D. ...</i>	<i>Favosites</i>
<i>C. ...</i>	<i>S. ...</i>
<i>Platysma</i> sp.	

} Bed E

The shale here is rather soft and can be crumpled in the hands. All of the beds carry corals.

## Bed F

Consists mainly of calcareous shales, impure limestone that is hard and resistant and mixtures of the two. The rock forms a cascade in the creek. The stone is a medium dark grey in section but a light grey when weathered. A good deal of it is taken on the surface from iron rust. The weathering of the stone in the creek leaves irregular knobs of the harder masses.

Corals are quite abundant, the genera being -

*Zaphrentis*, *Cyathophylloids*, *Cyathophylloids*, *Favosites*, etc.

Other fossils are -

<i>P. ...</i>	<i>P. ...</i>
<i>P. ...</i>	<i>P. ...</i>
<i>P. ...</i>	<i>P. ...</i>
<i>P. ...</i>	<i>M. ...</i>

I would locate the Centerfield behind the first house on the east side of the road just over the brow of the hill. There is a small stream running thru the orchard by this house and it is the only one of the kind on the east side of the



# Menteith Point Ravine

45

August 3

45

Falls with Menteith is about 250 paces and 60 paces above the falls at the Menteith ravine are 45 or more feet of shales which are dark gray in color, and in the lower part at least give no effervescence with acid. Through the 45' of shale measured, *J. carinatus* in large forms is common. There are also at times bands of limestone in which *J. carinatus* plays a prominent role.

In some large blocks the following fossils were found:-

<i>Phlebotomus?</i> n	<i>C. bothei</i>	<i>M. concentrica</i>
<i>P. lanceolata</i> n	<i>C. setigerus</i>	<i>S. cheamungensis</i>
<i>L. punctata</i> n	<i>S. pinnatus</i>	<i>Pompholus</i> sp.
<i>C. carinatus</i> n	<i>Pal. concentrica</i>	<i>G. arcuata</i>
<i>J. carinatus</i>	<i>S. solenoides</i>	<i>O. parvula</i>
<i>A. carinata</i>	<i>N. trigonata</i> small	<i>A. spinulosa</i>
<i>P. radiata</i>	<i>Lox. hamiltoni</i>	<i>S. difficilis</i>
<i>P. nodosostata</i>	<i>A. undulata</i>	<i>C. corrugata</i>
Large <i>Spirifer</i> etc.	<i>E. stricta</i>	

This fauna is identical to the one carrying *Dorsidoleptus* and *Pleurodictyon* at Murder Creek and Fall Brook.

Between 150 and 187 paces a portion of the bed is covered by large *Spirifer* and several *Pleurodictyon* and *Dorsidoleptus* also *S. hintoni*.

At 220 paces the shale is much covered with *J. carinatus*. At 240 paces there are layers of ss. are covered with *C. species*, *S. exigua* & other layers. Other fossils between 220 + 240 paces are *Pleurodictyon* on B. beds, *Pleurodictyon*, *P. apiculata*, *N. bellavista*, *N. nana*, *J. bellulus*.

Small concentrations about in these layers above the Menteith ls. and some of them contain fossils.



At 263 paces a 2" band of calcareous shale rock with irregular & locally fracturing and largely made of fossiliferous small cascade in the stream. Thin stone and that below contains:

<i>C. impressa</i>	<i>C. coronatus</i>
<i>R. vancouverensis</i>	<i>P. ramosa</i>
<i>L. granulosa</i>	<i>D. sculptilis</i>
<i>A. sp.</i>	<i>L. pumilus</i>
<i>A. spiniferoides</i>	<i>P. shanahanensis</i>
<i>S. marginata</i>	<i>E. lindblomii</i>

*W. dekeyri* on a piece of stone. I can't find here but none at all in the cascade.

Just above the come light-colored shales on the south of surface and a rather dark grayish blue section. There are not as fossiliferous as those below. The fossils occur mostly in layers or bands. The one of the beds just above the cascade were noted:

<i>Lystrodia</i> sp.	<i>A. signata</i>
<i>C. bellistata</i>	<i>V. pumilus</i>
<i>C. coronatus</i>	<i>L. arctostriatus</i>
<i>A. spiniferoides</i>	<i>A. shanahanensis</i>
<i>L. marginata</i>	<i>D. lindblomii</i>

A little higher up were found:

<i>C. brothei</i>	<i>C. bellistata</i>
<i>P. ramosa</i> (large)	<i>V. pumilus</i>
<i>S. marginata</i>	<i>D. undulata</i>
<i>C. setigerus</i>	

At 303 paces in another of the lower layers about 2' above stream the following were recorded:

<i>C. bellistata</i>	<i>C. vancouverensis?</i>
<i>L. pumilus</i>	<i>R. vancouverensis</i>
<i>P. ramosa</i>	<i>P. shanahanensis</i>
<i>V. pumilus</i>	
<i>Platyceras</i> (young)	
<i>V. setigerus</i>	
<i>A. setigerus</i>	



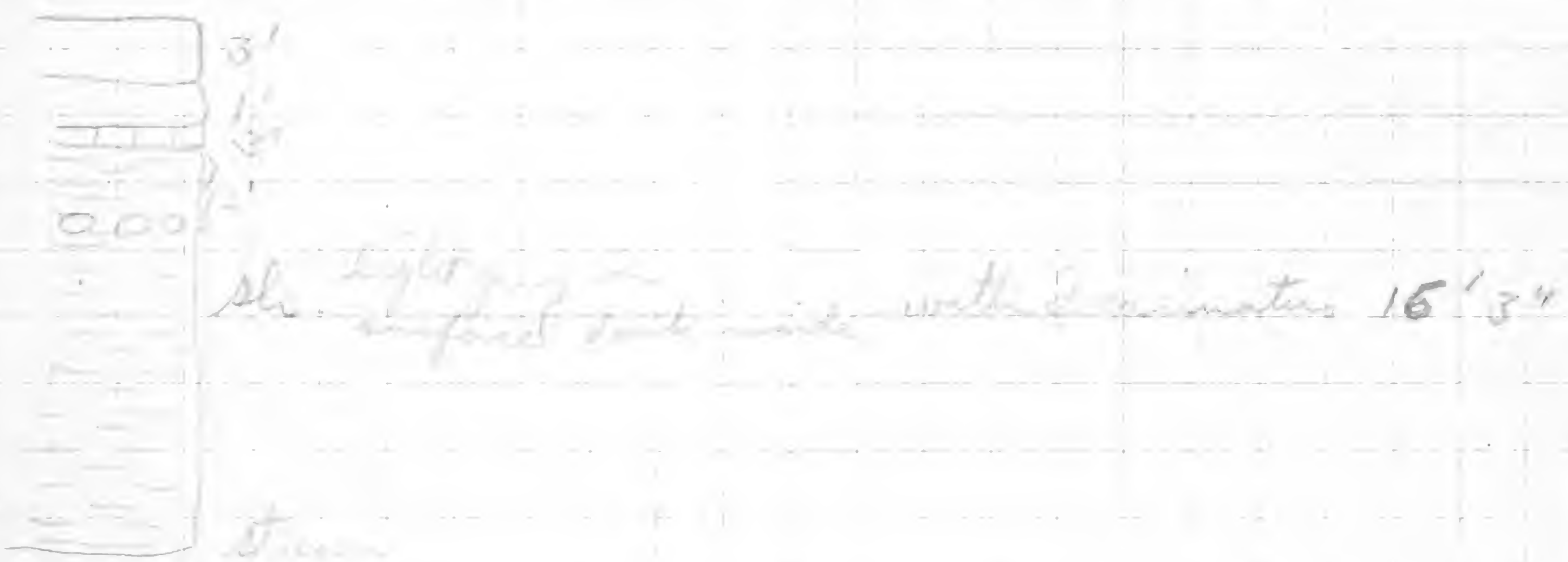
At 415 paces a thin calcareous band  
has *I. carinatus* & *S. inaequistriata*, the  
shales have *A. princeps*, *A. spiniferoides*,  
a large *Palmervillea* and *S. pennatus*.

At 525 paces the shales yielded

<i>Megistocrinus</i>	<i>S. pectinatus</i>
<i>A. spiniferoides</i>	<i>C. coronatus</i>
<i>I. carinatus</i>	<i>P. rana</i>
<i>S. solenoides</i>	<i>Camarotoechia</i> sp.
<i>Pan. hamiltonae</i>	<i>Cryptocella</i>
<i>N. triquetra</i>	<i>P. constructa</i>
<i>Pleurodicta</i>	

The fauna is the same as below but  
*I. carinatus* is much less abundant.

Section at 600 paces



Section at 700 paces.





At 700 paces R. grandes  
 J. caninus  
 J. caninus  
 C. coronatus  
 Cyrtodictya  
 S. granulosa  
 Bryozoa

At 1050 paces the stream bed is crowded with corals, some of them leaving the impression of an R. elphagii. At 1117 paces S. caninus is still present in the stream bed.

At 1152 paces a ledge is found a rounded in the stream bed. It is very hard, black grey, with crinoid stems and contains a great abundance of S. concava. 3' above this is another ledge, at 1168 paces, the water flowing over a somewhat arenaceous shale, hard and gritty to the teeth. It is slightly calcareous. The rock in between the top of the arenaceous top layers and the ls. contain

R. fimbriata  
 ✓ A. reticulatus  
 ✓ S. concava  
 ✓ Proetus sp.  
 Cyrtodictya sp.  
 C. boethi  
 ✓ M. concentrica  
 C. boethi  
 Cup corals  
 L. perforatus

S. granulosa  
 ✓ P. rana  
 ✓ D. busatus  
 ✓ A. spiriferoides  
 ✓ C. recurva  
 C. dracunculiformis  
 Ceratopora  
 Bryozoa  
 C. coronatus  
 Cyrtodictya

The upper arenaceous shale beds are not very fossiliferous but contain C. muricata (occasional)?



At 1314 paces 8' of shales are exposed. These are crumbly and light gray on the surface, dark within. In the first 2 feet of them are many fossils abundant. *S. granulosa* and *C. rhomboides* (various?) and *P. vana*. Less abundant are:-

<i>C. ballistata</i>	<i>Platysma</i> sp.
<i>M. concentrica</i>	<i>B. lida</i>
<i>S. lineata</i>	<i>A. reticularis</i>
<i>A. praecumbens</i>	<i>Cyrt. hamiltoni</i>
<i>A. umbonata</i>	<i>C. coronatus</i>
<i>R. vanuxemi</i>	<i>A. spiniferus</i>

About 6' above stream bed zones or bands of *A. umbonata* can be noted.

At 1400 paces a large exposure (about 20 ft.) and in the bluish limestone were found that have *A. praecumbens* (?) in great abundance. Concretions here yield fossils such as *R. finlayana*, *C. coronatus*, *S. pinnatus*, *A. reticularis*, etc. the shales, besides these are *S. granulosa*, *Cyrt. coronatus*.

At 1450 paces in the stream bed *A. umbonata* is very common. Also here was noted *S. pinnatus*, *A. reticularis*, *A. praecumbens*?, *Streptelasma*. Between 1700 and 1800 paces the following fauna is recorded.

<i>R. vanuxemi</i>	<i>Rana</i> c
<i>S. granulosa</i> c	<i>Pal. fecunda</i>
<i>A. reticularis</i> c	<i>Cyrt. lineatus</i>
<i>Streptelasma ret.</i> c	<i>S. sculptus</i> ?
<i>A. praecumbens</i> ?	see large slab
<i>A. spiniferus</i>	

At 1900 paces the following were noted:-

<i>S. granulosa</i>	<i>S. pinnatus</i>
<i>S. undulatus</i>	
<i>R. vanuxemi</i>	



At 1962 paces the shales break into thin pieces and are a light brownish grey on the surface:-

Fossils:-

*O. bodinensis var. media* cc  
*E. laura* cc  
*C. cincta* v  
*A. spiculosa* v  
*A. praecumbens* cc

A zone of this kind was noted in the Chert Bed at Fall Brook

At 2064 paces the fauna again becomes like that below. Here are these:

<i>S. rectum</i>	<i>A. reticulata</i>	<i>L. stellata</i>
<i>A. spiculosa</i>	<i>S. granulosa</i>	<i>S. pinnatus</i>
<i>T. stellata</i>	<i>Orthis</i>	<i>C. cincta</i>
<i>Cyclonema</i> sp.	<i>P. lineatum</i>	<i>L. inaequalis</i>
<i>A. andaculus</i>	<i>Eudiphyllum</i>	<i>R. sinuata</i>
<i>R. cyclus</i>		

At 2300 paces in the stream bottom & a foot up the fauna is as follows in small calcareous layers:-

<i>I. sinuata</i>	<i>S. cf. marcyi</i>
<i>Orthis</i>	<i>A. spiculosa</i> c
<i>S. pinnatus</i> ?	<i>Pleurodictya</i> ?
<i>S. inaequalis</i>	<i>S. granulosa</i>
<i>A. reticulata</i> cc	<i>Orthis</i> sp.
<i>T. stellata</i>	<i>Comolites</i> laev.
<i>Crinoid</i>	<i>S. pinnatus</i>
<i>S. lineatum</i>	<i>Pleurodictya</i> sp.
<i>S. pinnatus</i>	

2384 paces - same

2600 paces the fauna is as follows above stream level.

At stream level and 1' above here the following species were found:

<i>S. rectum</i>	<i>R. sinuata</i>
<i>A. andaculus</i>	<i>S. lineata</i>



*T. cuneatus* is not very abundant in these upper beds. These beds have lots of *Phygon* in the calcareous bands. At 2760 paces the fauna is the same.

2910 fauna about same but fossils less numerous. *Pipite constrictus* common here.

At 3052 paces about 10-15 ft below the base the following were found

*Lingula* sp.

*Leptotheca* sp.

*T. submarginata*

*C. testaceus*

*S. andaculus*

*S. tellus*

*S. sumatranus*?

*C. brachy*

About a foot below were found

*L. brachy* *T. pygmaea* *Pipite constrictus*

*C. scutellatus* *C. brachy* *S. brachy*

The base of the stream at 3350 paces, 180 paces downstream from the fork in the stream. A pipite lens of 1/2" thickness was noted. *Pipite* here, but they are not common. The *Pipite* lens is in contact with the *Pipite* lens. *Pipite* everywhere.



August 3.

The deep Run shale by Grand level in the picture. It is 59' 7" or 60' thick.

Montic Point (Montic Point) shale. The top of falls is 285 paces. Falls is 28' high.

Found some in the shale are:

*G. carinatus* c

*G. pinnatus* c

*Schizothaenia*

*Leptæa* sp.

*Leptæa* sp.

*P. schistata*

*G. carinatus*

*S. pinnatus*

*O. pinnata*

*Goniophora* sp.

*G. aculeata*

*G. boylei*

*G. pinnata*

*L. schistata*

*L. schistata*

*E. carinatus*

*P. styliformis*

*R. spiniferus*

0-250 above in the shale. 11 vertical

at 322. Rocks come then bands of shale

shale containing *E. pinnata*

Family of these are *E. pinnata*

*C. carinatus* c *M. carinatus* c *G. pinnatus* c

*R. carinatus* c *P. carinatus* c *G. carinatus* c

*A. carinatus* c *P. carinatus* c *G. carinatus* c

The *E. pinnata* of the shale is about 15' above the

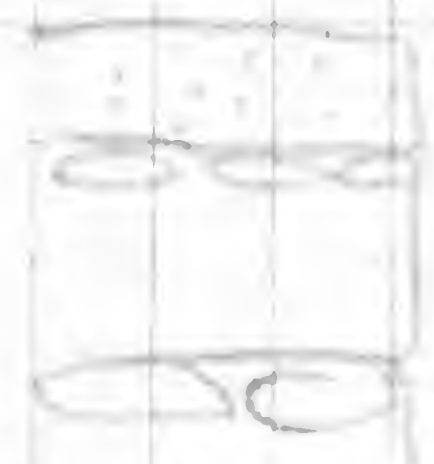
Montic Point and the *E. pinnata* bearing

layers occupy about ~~15'~~ 3'

322-352 same. The *E. pinnata* is found 2' above at 322 paces.



# Reservoir Study



3' 2 1/2' thick  
concretions

Shale 5'

Interbedded with

shale 19'



C. n. p. sand shale & calcareous shale & limestone

45'

Men. totto



At 572 - more common

Par. ham

Unio

Microconchus

Platysa

S. pernatus

S. minutus

H. arborescens

At 850 - 2' above the base of the main section

S. minutus

At 1119 comes the unconformable bed  
section at unconformable bed

The Rushong shale appears to me to  
be a rather typical siltstone



sandy sh.

Strophodonta

Colonicus bed (concretionary)

shale 2 1/2'

concretionary

8'

then

At 1219 passes comes the 1/2' cascade  
over the sandy shale which is about  
3' thick.

Fossils in the sandy bed are -

C. microconchus

A. granulosus

C. arborescens

Microconchus

figura

Strophodonta

P. arborescens

S. minutus

S. minutus

C. minutus

P. arborescens comes at the base of the  
bed is a population with S. figura

Crin. ham

See the big strophodonta are most  
abundant in the 2' of shale between  
the concretionary bed and the upper sand  
bed.



18-15' Dark shale  
2' sand

35'-45' *Strophomena* - *Strophomena* zone  
42'

6-8' *Strophomena* zone  
Dark shale  
2' sand

14' *Strophomena* zone  
light blue gray

20'-22' *Strophomena* zone

3' sandy layer



This shale just above the sandy layer abounds in *A. umbonata*, and *C. pinnatifida*. This then is the beginning of the typical Ordovician just above the sandy layer.

For the first 5'5" of above the sandy layer the rocks are mostly concord except for about 3' on the sandy bed, but at 1350 paces there is about 15' of shale exposed. This is at about 5-13' above the sandy band. fossils in this shale are:

*A. umbonata*  
*P. ruga*  
*A. granulosa*  
*S. pinnatifida*  
*C. setigera*  
*Trilobites*

*S. planaria*  
*R. foliata*  
*C. pinnatifida*  
*S. pinnatifida*  
*Phylloporus*  
*C. pinnatifida*

at 1490 - which is 16' above the sandy band *Ambocoelia* still occurs in various other fossils here are:

*P. ruga*

*C. setigera*

The *Ambocoelias* are common for fully three feet (19' above sandy layer) above stream level where a layer of *Ambocoelia* occurs. The *Ambocoelias* disappear between the 2nd & fourth steps about 1571 paces. This makes this bed about 20' thick. Fossils in this shale above *Ambocoelia* bed exposures are patchy but the following were seen:

*P. ruga*  
*Ambocoelia*  
*S. pinnatifida*  
*S. pinnatifida*  
*A. planaria*  
*A. granulosa*  
*R. foliata*

*Strophomena*  
*C. pinnatifida*  
*A. setigera*  
*S. pinnatifida*  
*S. pinnatifida*







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 36.00
 \end{array}$$

$$\begin{array}{r}
 242.4 \\
 - 13.30 \\
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 229.10
 \end{array}$$

$$\begin{array}{r}
 242.4 \\
 - 13.30 \\
 \hline
 229.10
 \end{array}$$



The succeeding shale is bluer and abounds in fossils.

*A. reticulata*  
*A. pumilio*  
*A. canescens*  
*A. sp.*  
*A. finibunda*  
*A. discusnata* 2  
*A. discusnata*  
*A. sp.*  
*A. sp.*  
*A. sp.*

*P. Hamiltoni*  
*C. distincta*  
*C. audacis*  
*L. perplana*  
*D. insignistrata*  
*C. cothi*  
*A. spinifrons*  
*D. chinensis*  
*C. coronatus*

At 2944 the *Atrypa*-*Spinifer*-*Cystodonta* band disappears and the bedrock darkens. This is about half way between the 14th & 15th steps making for this zone about 40'. The actual change from the bluish calcareous shale to the dark shale comes at about 3089 + 1' above stream, or about 3' below the 15th step and is thus about 12' thick for the *Spinifer*-*Atrypa* zone. The shale of this zone is bluish-grey, blue-grey, crumbly to small fragments. It contains many concretionary and thin calcareous beds abounding in bryozoa. The above fauna appears only the common elements. *C. distincta* comes in after about 20'.

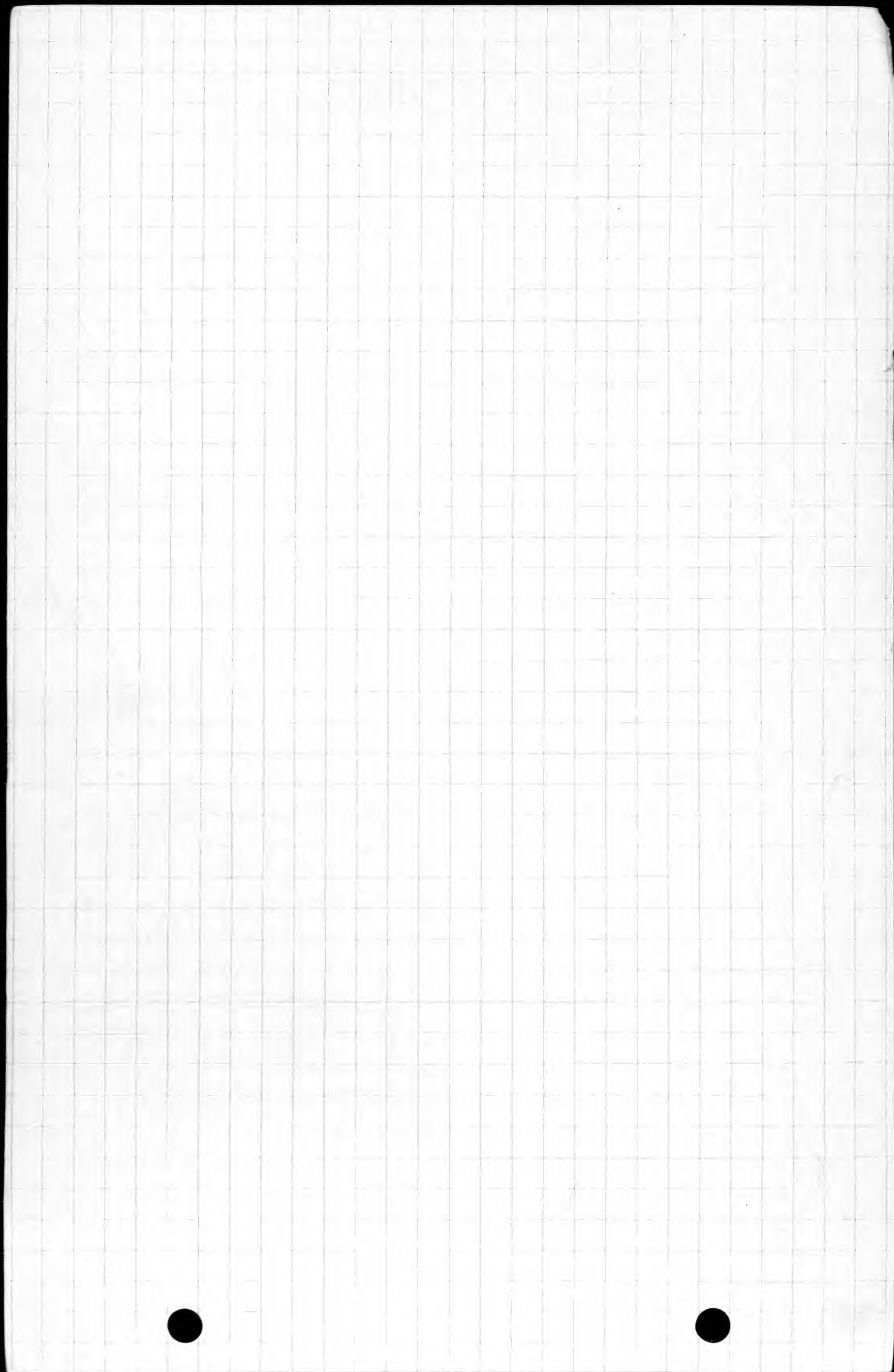
The uppermost shale is black and contains *A. canescens*. It is 16-18 feet thick.

*L. canescens*

The *Atrypa* contact is at 3454.

The black *Hamilton* can be easily distinguished from the *Ganges* by a small number of thin plates, but in the flat sheets of the *Ganges*, it







also weathers to a bluish surface. The exact contact can be distinguished by the pyrite. The pyrite of the Hamilton is of the flinty variety of the Laramie and is in sharp contrast. These are about 5' of dark bluish transitional to the red color and are not as evenly as the upper black shale and in a lighter color.

The Amblygonite is terminated at the concretions. It is over the sandy layer.

The Keshong shale appears to be about 45' thick here.



August 4

Deep Run

At 700 paces from the highway the first outcrop of shale is met. It is about 15' vertical.

At 750 the fauna and rocks can be more closely examined. Here the rock is a soft gray shale weathering to blue gray fragments. Fossils are -

*P. sinuella* *P. punctilifera*

*A. lamellosa* *A. truncata*

*C. boath* *S. parvatus*

*P. grana*

*L. spina*

Between 750 and 841 paces the *Lionynchus* has apparently dropped out. *A. truncata* is common. Other fossils are -

*L. hamiltoniae*

*A. truncata* sp.

*B. obo*

*S. truncata*

*N. trig. (large)*

*P. caimatus* (very small)

*C. lepidus*

962 paces

*A. sinuella*

*P. sinuella*

*N. sinuata*

*D. subulatus*

*B. pallida*

986 paces - large *S. sinuata* also very common as also -

*A. sinuella*

*S. sinuata*

Other fossils are *Conularia undulata*, *Crin. lamellosa*, *A. sinuata*, *S. sinuata*, *A. truncata*, *A. princeps*? The *S. sinuata* here are of very large size, larger than at any other horizon. This was also noted at the Lake Shore

Between 1000 and 1031 paces the following species were seen -



Favosites sp.

D. linearis

Pteroceras sp.

Pal. Pennelliana

C. virens

S. papillaria

at 1031, near C. virens

literally swarms

the rocks. Here also are large specimens

of Favosites of the transversal variety.

At 1031, a small step falls extending back

50 ft or more. The depth is noted.

D. linearis

Pal. constructa

M. concinna

✓ R. fimbriata

Stromatopora of virens

✓ C. corollata

Fossils noted in the points:

R. Trinqueta

✓ P. papillaria

Pteroceras sp.

S. gibbosa?

Bleda

✓ R. carinata

S. subglobosa?

Pal. fimbriata

P. virens

✓ J. carinata

✓ S. papillaria

C. belluata

✓ Favosites sp.

✓ S. subglobosa

✓ C. corollata

Pal. constructa

The Tichenor occurs just 16' above the 1031 step. Other fossils found below are

✓ P. papillaria

✓ M. concinna

✓ S. virens

✓ B. linearis

✓ J. fimbriata

✓ C. corollata

✓ R. carinata

✓ Stromatopora sp.

✓ E. linearis

✓ C. subglobosa

✓ Lichenaria

This exposure is not ~~unlike~~ that at Wheeler Gulch, where bands of ls. ripple up north. Sp. fossils & coralloid stems found cascades. Here there is a prominent band about 2' thick, 2 1/2' below the Tichenor. Other bands are less prominent and have less effect on the contour of the stream. The proper assemblage of corals in the upper band is not noted here. Corals are not found in the lower band.



first, that is cup corals, about 10' below the Tichenor.

### Tichenor loc.

About 13" thick in the face of the falls. A. magnifica was not identified. The entire section is 27 paces.

### Section

The rock on the Tichenor is hard almost a ls. but is advanced with considerable shale. The lowest 2' fossils are difficult to extract but the following were recovered.

<i>P. cf. nana</i>	<i>D. linearis</i>
<i>P. nana</i>	<i>R. fluitans</i>
<i>Prot. huttoni</i>	<i>P. undulata</i>
<i>C. subcapitata</i>	<i>A. gracilis?</i>

96 paces above the Tich. On sand covering by hard shales. As of the stone yielded the following.

<i>Prot. huttoni</i>	<i>Prot. huttoni</i>
<i>M. coarctatus</i>	

161 paces

<i>P. nana</i>	<i>C. elliptica</i>
<i>Prot. huttoni</i>	<i>D. pectinata</i>
<i>C. carinata</i>	<i>C. brachy</i>

236 paces

<i>C. nana</i>	<i>C. carinata</i>
<i>S. undulata</i>	<i>C. coronata</i>
<i>P. princeps</i>	<i>Prot. huttoni</i>
<i>C. planicostus</i>	<i>Amatocochis</i> sp.
<i>P. nana</i>	<i>C. brachy</i>
<i>C. carinata</i>	<i>C. nana</i>
<i>C. arcuata</i>	<i>P. pectinata</i>

269 Paces

<i>A. erectus</i>	<i>D. linearis</i>
-------------------	--------------------



193  
240



At 458 paces is a large cascade  
representing about 20 paces high. Tully.

*C. brith*

*S. pinnatus*

*C. imbricatus*

*C. imbricatus*

*D. lineatus* cc.

At the top of this cascade is the ~~last~~  
Monteth ls. The cascade is 43' 4" high. The  
Monteth is 10-11" thick. Fossils noted in  
the shales below are

*Pal. constricta*

*C. imbricatus*

*C. brith*

*C. aculeatus*

Fossils seen in the Monteth are—

*A. princeps*

*R. banyensis*

*P. rana* ✓

*Optiacodes* ✓

*D. imbricatus*

*S. pinnatus*

*S. andersoni*

*S. perplana*

*M. deliazi*

✓ *M. constricta*

The stone here contains much shale  
and is therefore quite irregular on  
the surface.

In the Monteth are a number of shales  
with large & abundant *D. imbricatus*. This  
was followed for 250 paces.

### Tully ls.

2' 8" thick consists of a lower bed  
2' 4" thick and an upper one 4" thick.  
In the lower part of the main portion  
the rock crumbles easily to fragments. It  
is blue grey on the fracture section.  
It is located just south of the roadway. When  
the Monteth shale has been weathered  
away it exposes the under surface  
of the Tully and on this under  
surface have been found several  
traces of *D. imbricatus*.



In the bed there is considerable pyrite in the lower bed, as is in the lower bed in Madison Co. The thickness of the upper thin layer varies from 4-6". This layer has *Strophomena hypothyris* abundantly.

The strata below the gully break into very thin plates and have few fossils. The gully with this exposure is on the west side of the road about 75 yds north of Dr. M. Voorhees' residence. Voorhees has some in mind of Menteth ls. mentioned in the report. This exposure was known as the Elliott and Hall gully, now called the Hall gully.

### Fuge (Hall) Creek Ravine

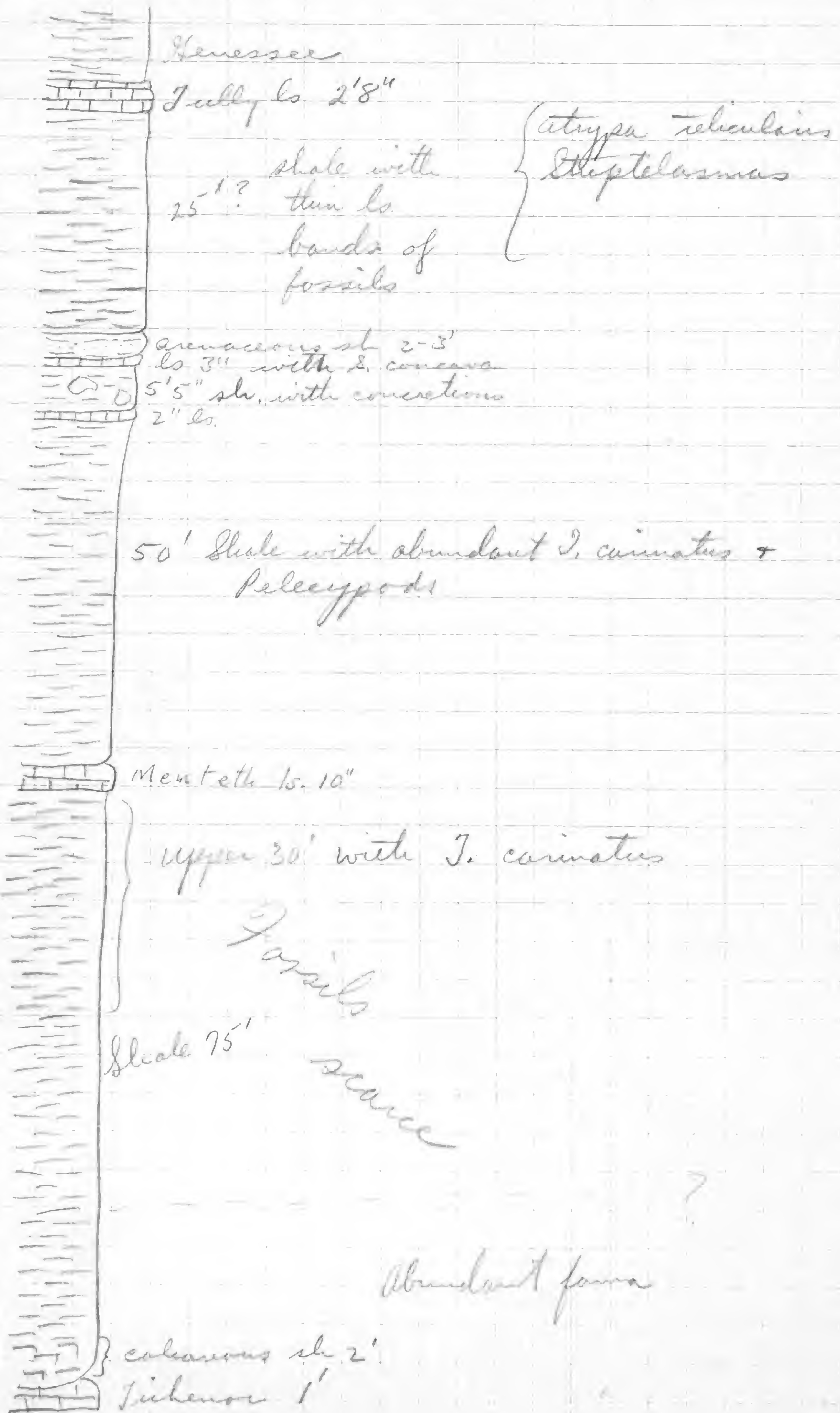
Traversed in company of Mr. Hall. Here exactly the same sequence was seen as in the other ravines. The Tichenor lies at the bottom about 50 yards east of the road. Luther's map does not have the Tichenor cross the road. About one quarter of a mile above the Tichenor the Menteth ls. mounts a 25 foot cascade. The Menteth here is nodular, with some shale. On Luther's report a mention of a series of nodular ls. crossing the stream at 50' above the Menteth was verified (not the height). The section here is as follows

2'	arenaceous sh.
3"	<i>Strophodonta concava</i> ls.
5' 5"	sh. with grotesque concretions
2" ls	
sh.	

In the concretions were noted pleuralae of *H. delongi*, and *S. pennatus*. Above the *S. concava* ls. came an arenaceous shale for about 2'.



A hypothetical section of the Moscow  
follows.





August 4, 1928

Page Creek

Lichen is 66 paces upstream from highway.  
Fossils observed in the lower 2' of the Deep Run shale  
are:

*P. rana* large  
Locals

*P. parvulinervis*  
*D. lineatum*

Cynoids

I make the Deep Run shale 55' thick by hand-  
level. 35' were leveled to the Mantella in a  
small side gully 243 paces upstream.  
from Lichen

300 paces up a calcareous lens in Deep Run  
containing

*M. concentrica*  
*P. oviformis*  
*Platygaster*  
*S. chinensis*

*P. rana*  
*S. signa*  
*M. vesiculata* (?)

At 660 paces comes a 25 foot fall capped  
by the Mantella.  
Fossils observed in the Mantella 8"-11" thick  
are:

*C. coronatus*  
*S. perversa*  
*S. sculptilis*  
*A. princeps*  
*Orthoceras* sp.  
*S. eximius*  
*C. planirostris*

*C. boethi*  
*C. scitulus*  
*P. rana*  
*S. perversa*  
*A. andreae*  
*R. vanuxemi*



S. sh. in Page Lake

Dully Co.

13 1/2' dark shale

~~24 1/2'~~ 33'

*A. pascuosa* 17 1/2' - 8'

*A. ...* 8' - 15'

22' *A. ...*

40' Kachong shale

*Mentell...* 8' - 1'

Deep River shale 55'

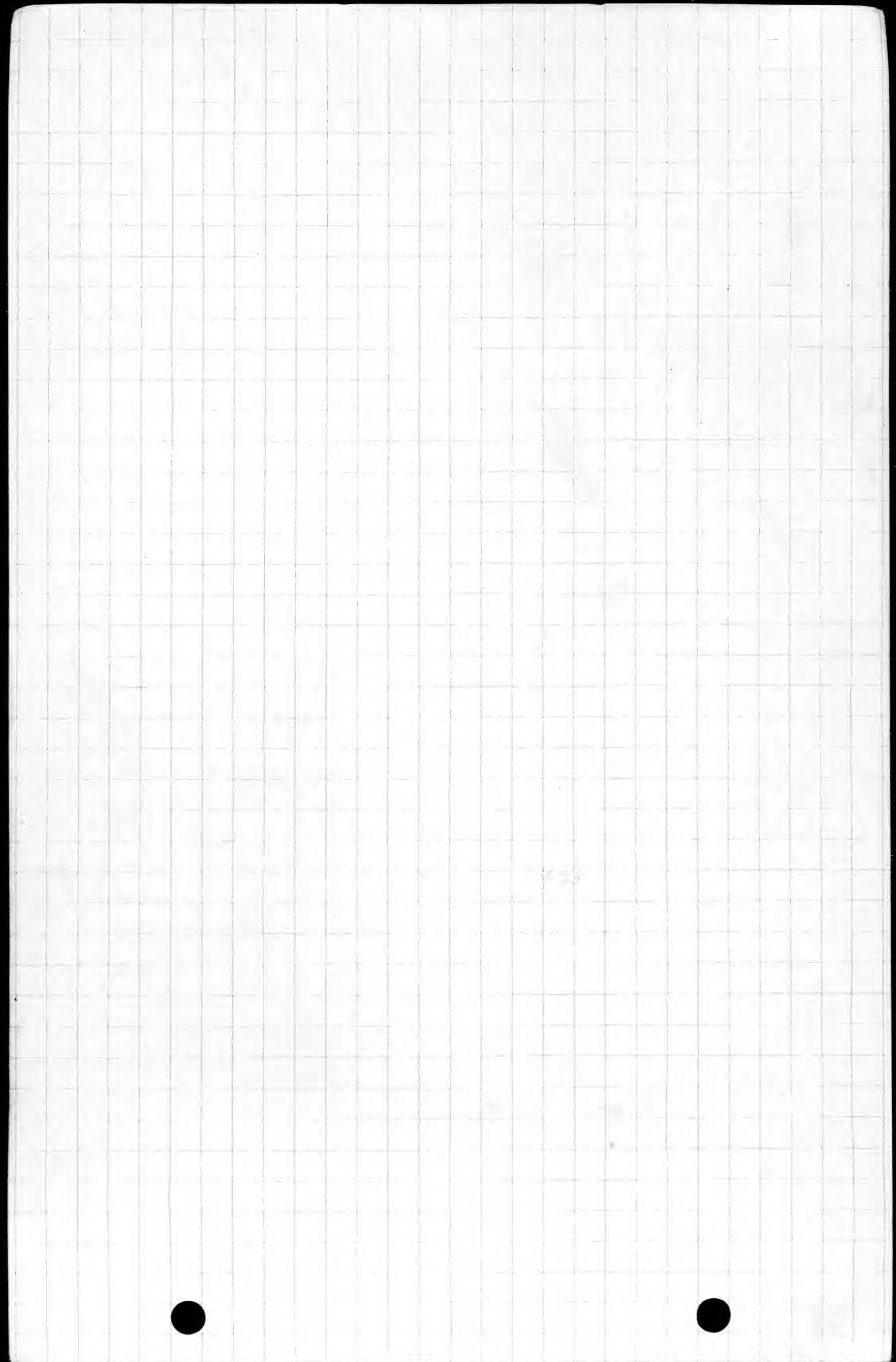
Section





3B'







## Fossils at the Kachong shale

*I. canaliculatus*  
*C. coriophorus*  
*A. reticulatus*  
*S. pinnatus*

*G. undulata*  
*P. constricta*  
*S. angulatus*  
*G. angusta*

also the 2-44 large occur.

*L. pinnatus*

*S. pinnatus*

*P. pinnatus*

## Ooid shale = Windom

All Ooid pages ~~are~~ above the sandy bed  
 The ~~shale~~ <sup>shale</sup> at level 25 pages  
 upstream from the ooids. ~~has the top of it~~  
 abundant in *C. canaliculatus* in abundance  
 also *A. undulatus*, *P. rana*, *S. pinnatus*,  
*I. canaliculatus*. It is an *arenaceous* shale  
 transitional to the sandy bed below  
 150 pages above the hard layer (10') the  
 ooids abound in *C. undulatus*, and *brachio-*  
*pinnatus*.

At 298 pages *C. undulatus* is in force  
 Other fossils are

*P. rana*

*C. undulatus*

*A. undulatus*

*P. rana*

*P. constricta*

*C. bellistriata*

*C. reticulatus*

*P. tenuis*

280 pages, is the top of the *brachio-*  
 beds at about the intersection of the  
 two streams. This intersection is 28' above  
 the sandy bed.



32







$$\begin{array}{r} 100 \\ 5 \overline{) 500} \\ 100 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 70 \\ 2 \overline{) 140} \\ 70 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 140 \\ 2 \overline{) 280} \\ 140 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 100 \text{ ) } 500 \\ 486 \\ \hline 14 \\ 140 \\ \hline 0 \end{array}$$

$$(32)$$

$$\begin{array}{r} 32 \\ 4 \overline{) 128} \\ 128 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 71 \text{ ) } 528 \\ 57 \\ \hline 51 \\ 18 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 74 \text{ ) } 100 \\ 74 \\ \hline 26 \\ 260 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 34 \\ 10 \overline{) 340} \\ 34 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 100 \\ 6 \overline{) 600} \\ 600 \\ \hline 0 \end{array}$$

$$21^7$$



*A. reticularis*

*A. andacuta*

*S. guina*

*L. immaculata*

*Platystrophia* sp.

*R. vandermeeri*

*S. perrinites*

It is 1073 paces to the falls over the  
fally which is 7' high. Fossils in the  
upper black shales of the Hamilton are

*L. laura*

*V. lepidus*

*S. mantium*

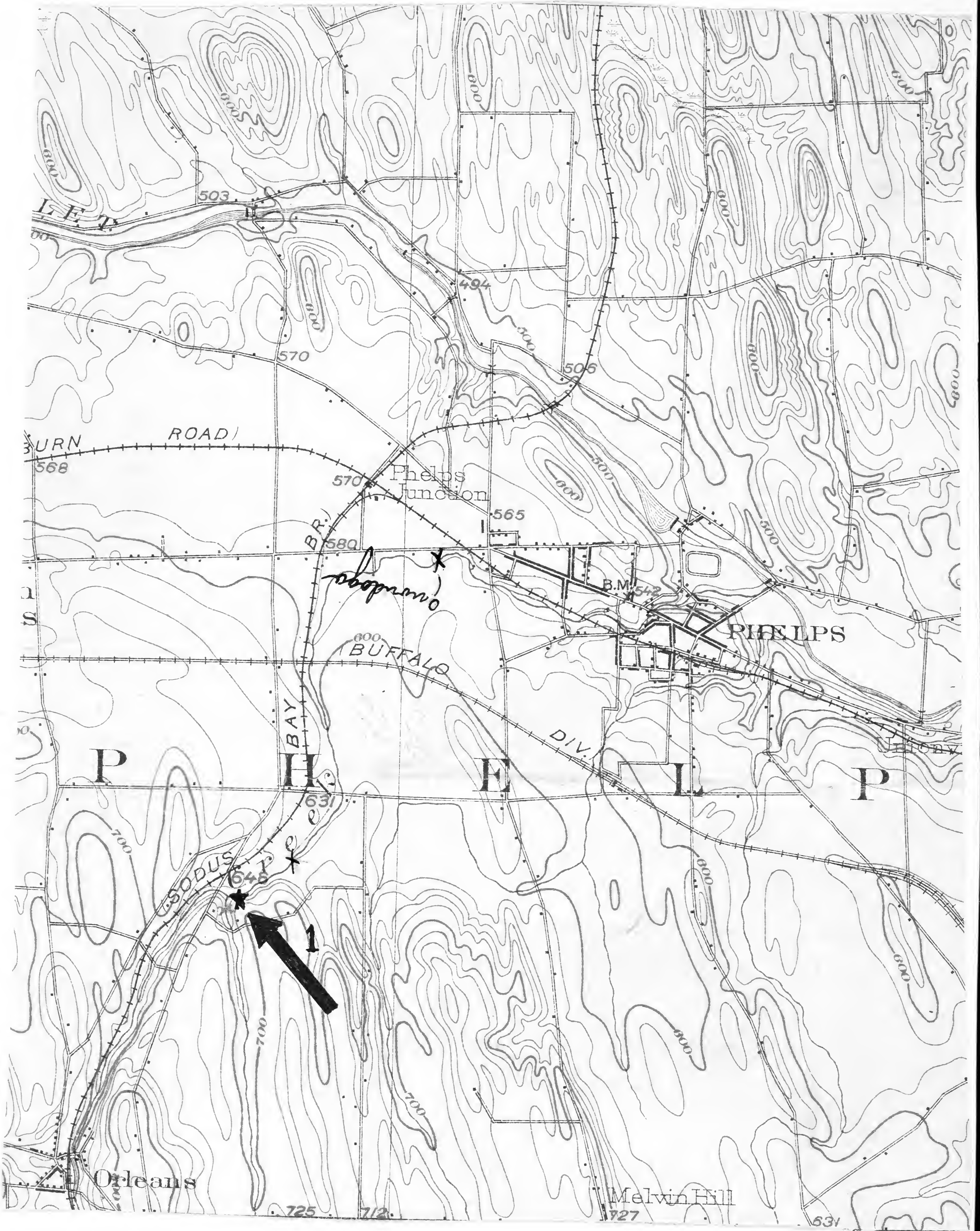
*H. tabularis*

The fally dips  $5\frac{1}{2}'$  in 71 paces or 162' amounting  
to about 208' upstream. This dip may account  
for the discrepancy in the thickness of the  
strata - Sprifer zone which terminated at  
1002 paces. On a scale this zone is 33'

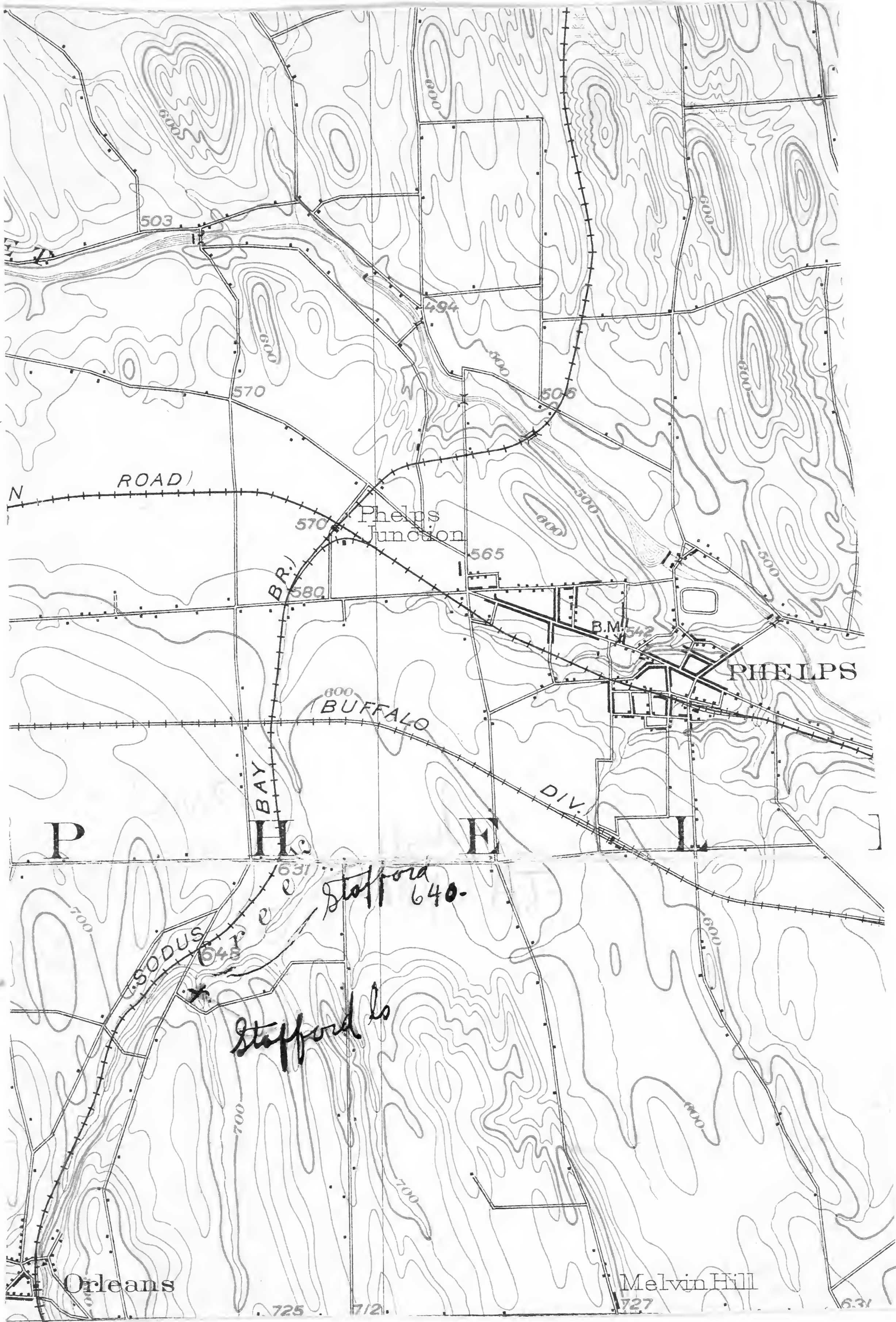
The *L. laura* of the *S. praevalens* zone  
is most common in the upper half  
of the zone.



68a









August 6.

Section on Flint Creek east of highway bridge, 2 miles SW of Phelps. Here 75' of shale east of the highway bridge can be found 8' ft of the Macellus shales overlies the Stafford ls. and this is about 20' of Cardiff shale. The lowest 15' of Macellus is quite unfossiliferous but immediately below the Stafford the black shale is crisscrossed with fossils.

### Macellus

The lower shales when marked off by the breaks are compact and break with curved fractures or into flat plates. These compact layers exist for about 2', then the shales are fissile and break into paper thin sheets. In the compact the there are thin grains of pyrite. The following species are recorded from the upper part of the Macellus.

*Pareucha* sp.  
*Spirifer* sp.  
*R. truncata*

*L. lenticularis* etc.  
*S. fragilis*

In the foot of shale immediately below the Stafford, it is calcareous and there are swarms of fossils, mostly *Ambocoelia* and *S. truncata*.



## Stafford ls.

About 6"-8" thick a compact hard ls. standing out prominently from the shales. Immediately below it are fossiliferous Marcellus shales. In section the Stafford is a rather light, blue-grey but it weathers to a tan grey or grey on the surface and brown on the interior. The stone when weathered crumbles readily particularly that on the under side when fresh it is resistant to the hammer. The rock is very fossiliferous, but the fossils are not as abundant or fine as those from the Stafford at Stafford, N.Y. Snails are very common in the fauna but are only well preserved in the shaly portion of the rock.

## Fauna

✓ <i>P. ...</i>	<i>G. ...</i>
<i>A. ...</i>	<i>G. ...</i> c
<i>C. ...</i> sp.	<i>D. ...</i> sp.
<i>B. ...</i>	✓ <i>G. capillaria</i> c
<i>P. ...</i>	<i>M. ...</i> sp.
✓ <i>D. ...</i> c	<i>L. ...</i> re
<i>Ambocodia</i> sp.	<i>M. ...</i> n

## Cardiff

On the Stafford are about 5 or 6' of friable, crumbly shales that split into thin flat flakes. These shales are blue black in color and thus lighter than the Marcellus. They give a decided effervescence with HCl. On these are shales that are dark blue grey and weather to an ashen grey. They are not as friable as these shales and crumble into heavier fragments.



83

1



These also give effervescence with acid. No fossils were found in the Cardiff here.

Just downstream a very short distance from the bridge another small brook enters. Flint Creek. This shows the same sections as above. It enters the main creek over a bed of closely jointed, unfossiliferous Marcellus shales. A short distance below the east highway which this small brook flows under the Stafford is exposed, as are the fossiliferous Marcellus beds. About 2' below the Stafford *L. limitare* is very abundant, but just under the Stafford *Strophalosia* are most common. Here a slab of ls was found among other Stafford slabs, which contain large coiled nautiloids. The Stafford here is from 4-6" in thickness.



Aug 6.

Hunt Creek

Below the Cherry Valley a number of layers of dark grey ls.  $\frac{1}{2}$ " - 1" thick separated by black shale. Surface of ls. irregular and pitted, shale undulating with irregularities in the ls. Surface strongly pitted by solution.

Cherry Valley - dark grey, only oolite, crumbly to irregular lumps. The Cherry Valley is 725 paces from bridge. I found a small creek near bridge the Stafford was at about 650' A.T. The Aqueduct is at about 620' A.T. making the thickness ~~about~~ shale 30' with about 10' for the Cherry Valley & ls. below.

The Stafford was measured at 6" Above it are 2' of black shale like the Marshall. Then the shale becomes bluer and coarser. There is about 25' of it exposed along the banks of the small stream to the ridge.



Fall Brook  
3 miles ESE of Canandaigua, N.Y.

- 058 - covered  
58 - dark, nearly black shale in stream bed.  
58-100 - covered  
100-135 - 1/2' thick of dark gray shale, barren of fossils, and some of this rock the traveler is very striking.  
135-432 - mostly covered  
432-435 - bank of dark, much jointed shale, and some fossils, but none very abundant.  
435-438 - covered  
438-501 - same shale  
501-535 - covered  
535-575 - same shale  
575-600 - covered  
600-613 - same shale  
613-615 - covered

615 - 3' thick

*P. minutus* (small) a

frane

cor. 1/2 in.

At the end of 3' above stream bed is a layer of limestone containing *Strophomena* and just above this there is a change in lithology and have seen the *Ammonoites* *Plumbidictyon* beds.



The concretionary bed with *Strophomena* is in the bed at 791 paces, the shale underlying the concretionary bed is covered with

*O. subulatum*

*Pal. constanti*

791-800 covered

Thin bedded sandstone with a few corals. 800-811

811-821 mostly covered

821-

*O. granulosa*

*O. pinnatus*

*B. lida*

*O. sinuatus*

*O. umbonata*

*P. sinensis*

*O. pinnatus*

*Pal. sinuata*

*O. lida*

*U. constanti*

*O. umbonata*

*O. bellustrata*

*O. sinuata*

*O. lida*

*O. sinensis*

*P. sinensis*

*P. sinensis*

*Avicula pecten*

*P. flabellum*

The concretionary bed is about 7' thick and extends about 3' above stream level at 882 paces. The shale above it is fissile and crumbles to small flakes.

882-926 covered

926-940 at stream level is a poorly bedded layer of calcareous shale about 6' thick. It is separated from an upper layer by about 10 inches of shale.



The lower calcareous layer contains:

*A. umbonata*

*L. rectum*

*S. punctatus*

*S. punctatus*

*P. coarctata*

*L. crassa*

*L. capillana*

*C. both*

The upper bed is about 1' thick. It has  
formed all defined layers along the side of  
the stream. Shells are found in the upper  
bed.

*L. crassa*

*B. l. c.*

*P. coarctata*

*S. oblongatus*

*L.*

940-1000 - covered

1000-1142

Soft, fine shale containing  
*A. umbonata* but fossils rare.  
This shale is like the bedrock but  
not so black.

1142-1157 - sandy shale

*B. l. c.*

1216 - Fossils are now nearly  
continuous.

1326

*S. punctatus*

*L. crassa*

1400

*L. crassa*



1921 1922 - about 4 ft. thick contains the following

<i>A. unbonata</i>	<i>E. lutea</i>
<i>L. lamar</i>	<i>L. rana</i>
<i>C. longica</i>	<i>C. setigera</i>
<i>C. scutellus</i>	<i>S. pennatus</i>

at the 2nd the sand - but some of the sand is still in the

<i>A. unbonata</i>	<i>E. lutea</i>
<i>L. lamar</i>	<i>L. rana</i>
	<i>C. setigera</i>

About 2' below the top of the first 11.6 step comes

<i>E. pennatus</i>	<i>P. rana</i>
<i>A. unbonata</i>	<i>C. setigera</i>
<i>C. scutellus</i>	<i>C. longica</i>
<i>C. longica</i>	<i>L. densa</i>
<i>E. lutea</i>	<i>E. pennatus</i>
<i>P. rana</i>	

The appearance of the fossils apparently marks the disjunction of *L. lamar* and *A. unbonata*.

and 5' 10" (18.5 feet) - the sand brings the edge of the fossils. The 2nd 11.6 step is about 10' 10" in the pale. Fossils in the sand are -

<i>A. unbonata</i>	<i>E. lutea</i>
<i>P. stylus</i>	<i>C. setigera</i>
<i>C. scutellus</i>	<i>C. longica</i>
<i>A. unbonata</i>	<i>L. densa</i>
<i>E. lutea</i>	<i>E. pennatus</i>
<i>P. rana</i>	<i>A. unbonata</i>
<i>L. lamar</i>	

Some bones in concretions



2nd Step -

*D. cuneata*

*S. pinnatus*

3rd Step -

*D. pinnatifida*

*D. pinnatifida*

*C. sinuata*

*M. bryoni*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*D. pinnatifida*

*D. pinnatifida*

*C. sinuata*

*M. bryoni*

*C. pinnatifida*

*C. pinnatifida*

*P. oviformis*

*P. pavilionensis*

4th Step -

*P. lineata*

*Gavosites*

*C. andersoni*

*D. pinnatifida*

*C. pinnatifida*

*C. pinnatifida* sp.

*S. pinnatus*

*S. pinnatus*

*D. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

5th Step -

*D. pinnatifida*

*D. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*C. pinnatifida*

*P. pavilionensis*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

*S. lineatum*

The harbor is about 8.96' A.T. and is 35' high



August 5.

Fossils taken from the upper beds of the Ludlowville at Jackson Point.

- |                             |                              |
|-----------------------------|------------------------------|
| ✓ <i>L. dentata</i>         | ✓ <i>S. junia</i>            |
| <i>P. parvirostris</i> c.   | ✓ <i>C. scutatus</i>         |
| <i>P. minor</i>             | <i>M. concentrica</i>        |
| <i>C. boethi</i>            | <i>A. princeps</i>           |
| ✓ <i>A. r. trachis</i>      | ✓ <i>R. limbricata</i>       |
| ✓ <i>M. lachrym</i>         | ✓ <i>Ceratopora jacksoni</i> |
| <i>L. calabra st. talia</i> | ✓ <i>T. exigua</i>           |
| <i>C. induta</i>            | <i>Ambostrachia</i> sp.      |
| <i>D. lineatum</i>          | ✓ <i>L. papilosa</i>         |
| <i>Platystrophia</i> 2 sp.  | <i>Tricelospira</i> 2 sp.    |
| ✓ <i>S. inadequata</i>      | ✓ <i>C. coronatus</i>        |

Shaffer's Creek was traversed from the outcrop of the Ludlowville to the Centerfield. In doing so the blue gray shale with *L. curvatus* and *L. dentata* but no intervening beds was discovered. This creek was also traversed upstream from the point of exposure but no additional beds were found. *Tricelospira* and *Ambostrachia* were those which were 2 or 3 hundred yards above the outcrop, but their continued presence was not noted. The only bed worthy of a note was that which was noted and this was the one which was noted on Tuesday, Aug. 2.

As far as I can make out, the middle beds of the Ludlowville (Onondaga) do not outcrop here, or if they do they are not accessible.



$$\begin{array}{r} 26 \\ 2 \overline{) 52} \\ \underline{40} \phantom{0} \\ 12 \phantom{0} \\ 2 \overline{) 12} \\ \underline{10} \phantom{0} \\ 2 \phantom{0} \end{array}$$



Carondagua 1978

August 2

Creek running to west corner

0-1150 - covered

First exposure seen, 1152 paces, 3 feet, shale about 25' thick, blue gray & fine grained

*L. marginata*

1152-1235 - covered

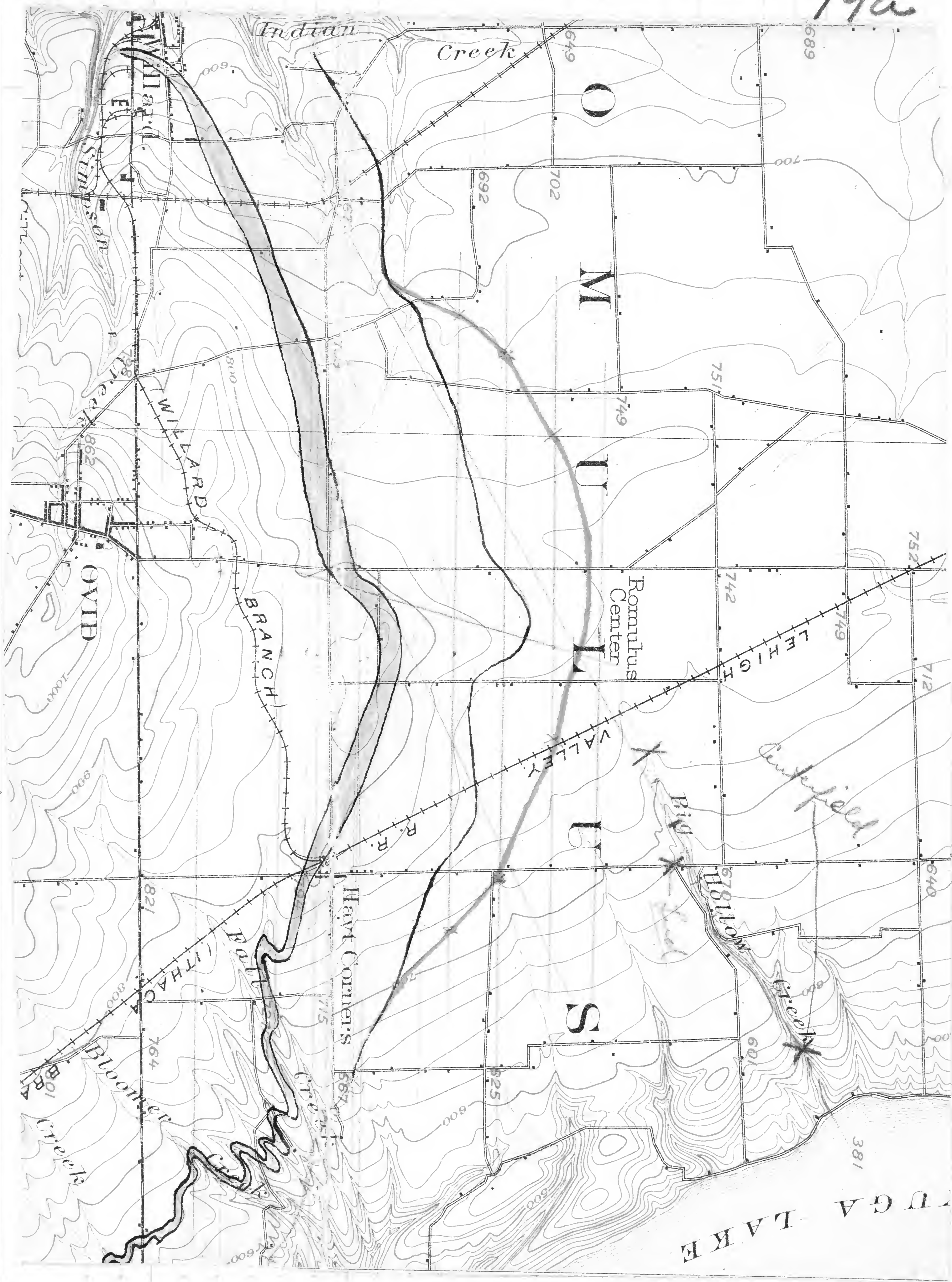
1235-

At 1235 which is covered in the stream bed but the thickness is about 10' of shale, many fossils, including some corals and brachiopods.

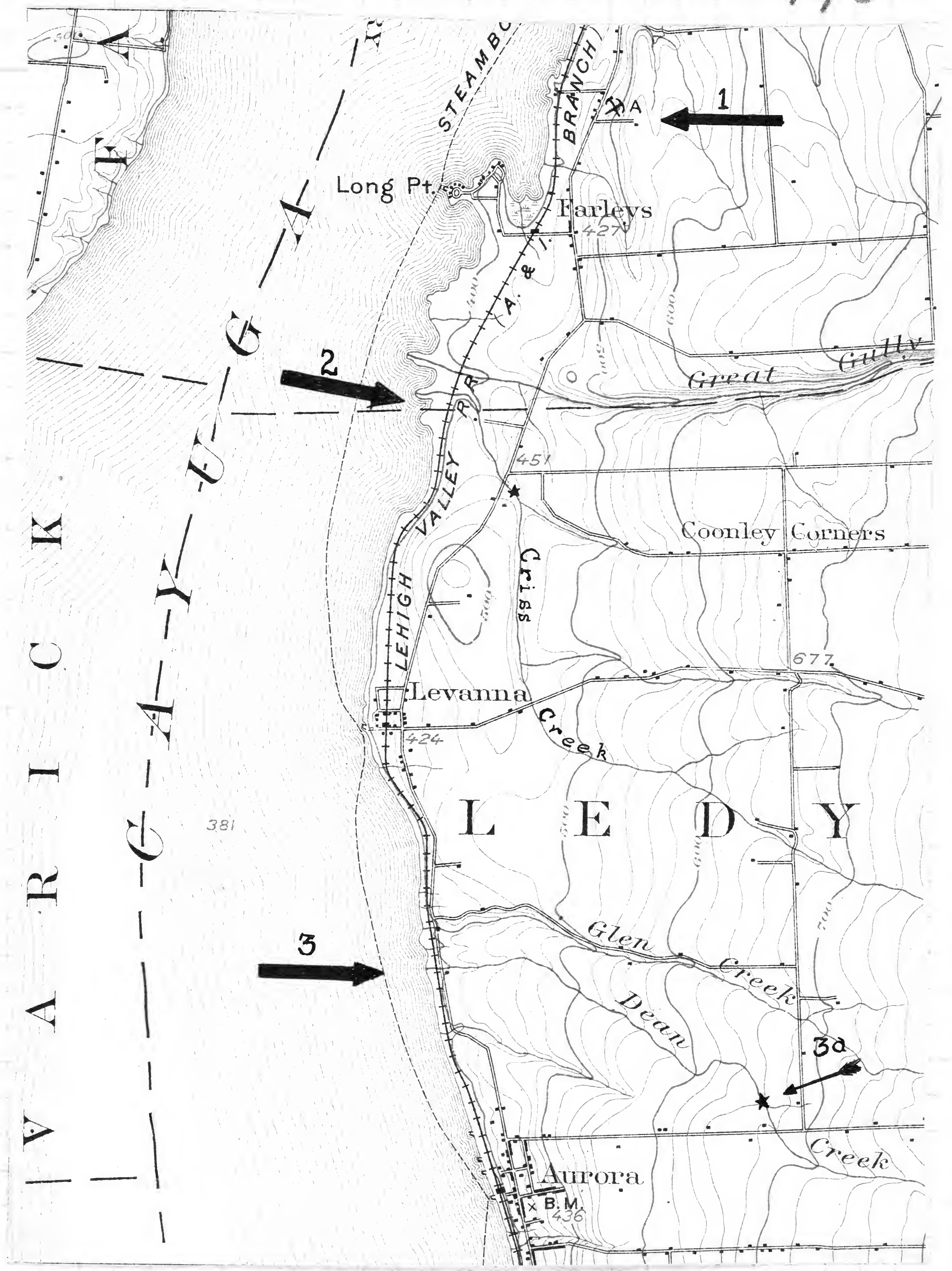
The thickness was noted in the stream about 38' above the first house along the roadway.



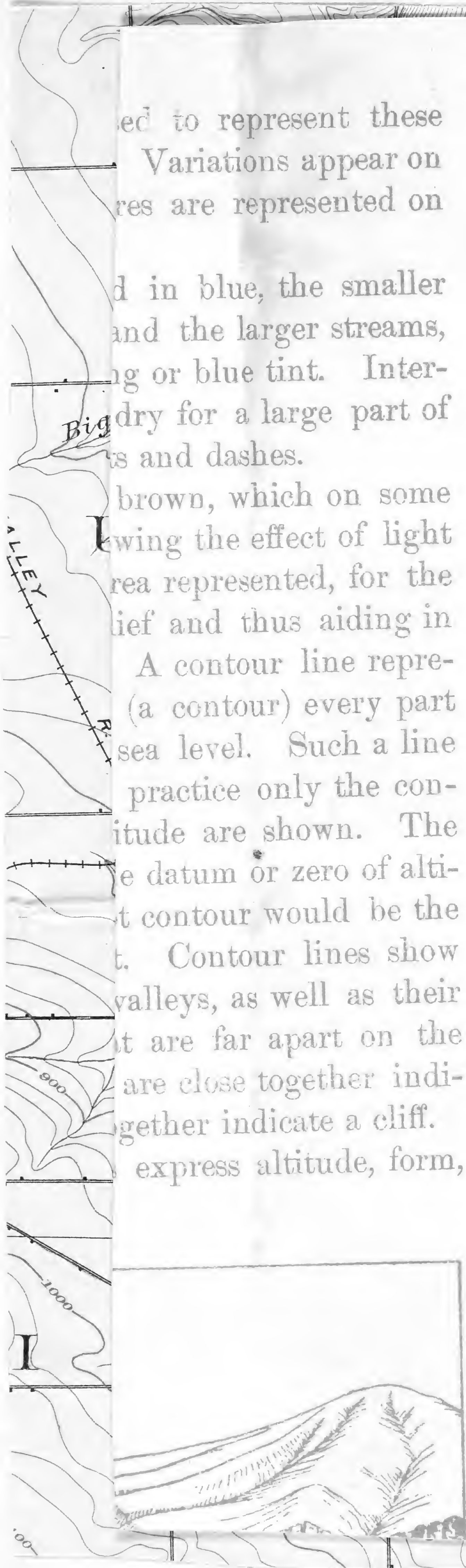
79a











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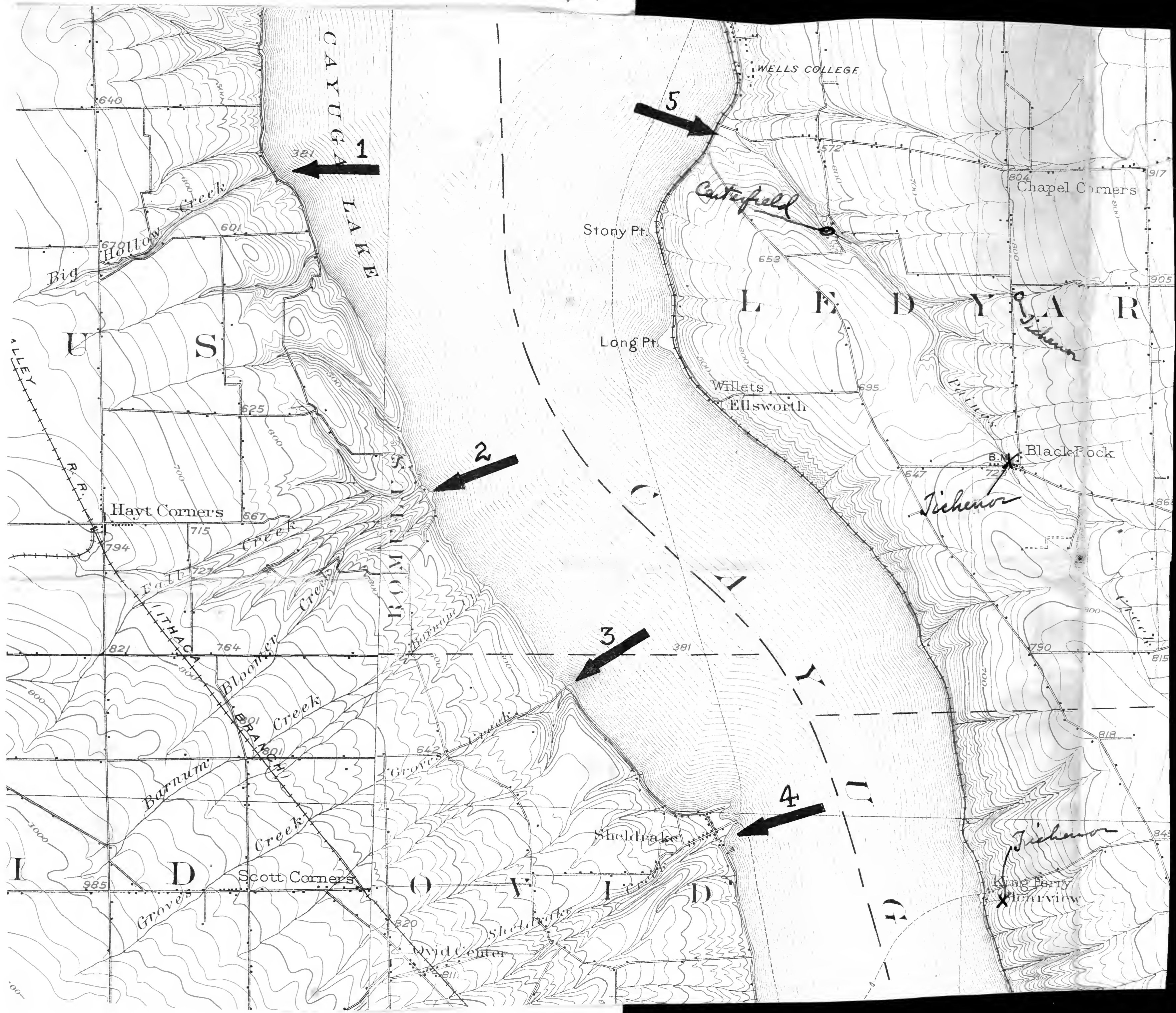
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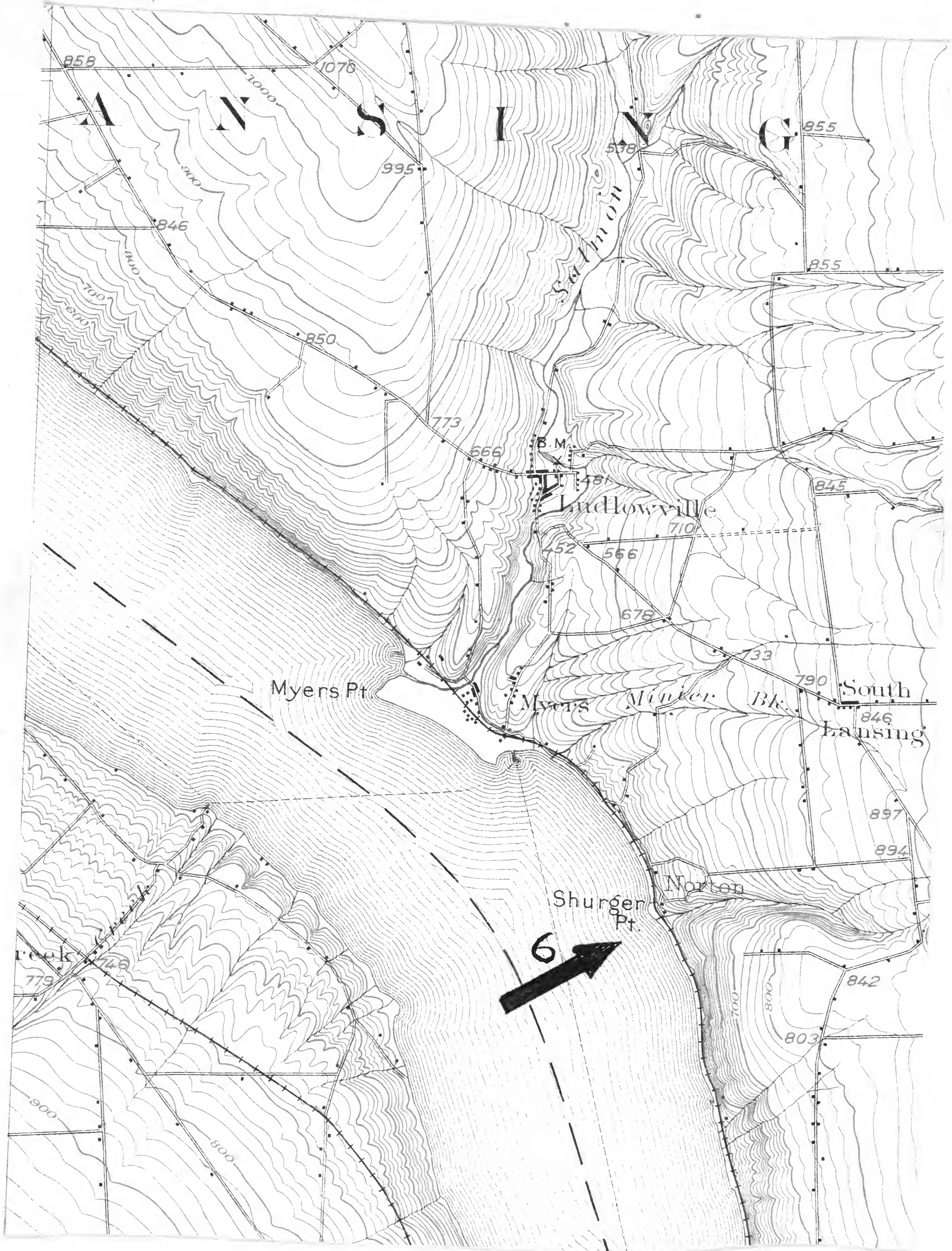


79a





79c





August 10.

## Big Hollow Creek

About 31 paces from lake road are exposed about 10' of shales which are very dark grey in section, soft with a slight purple tinge on the surface. They are much fractured by irregular joints which in many cases have curved planes. Fossils are few:-

*P. fragilis*

*H. triquetra*

*H. oblongatus*

*A. small gastropod*

393 paces soft very dark grey, much jointed shales are exposed for about 20' horizontally and 15' vertically. The shales are only slightly calcareous and have very irregular parting planes. Fossils are more numerous here.

*E. rugulata*

*H. triquetra*

*C. scitulus*

*C. setigerus*

*H. oblongatus*

*C. cf. lepidus*

*L. curtum*

*P. fragilis*

From 535 - 558 paces these shales are exposed and for fully 30' vertically. At stream level the following species were noted:-

*C. lepidus*

*H. triquetra*

*C. setigerus*

*L. pennatus (small)*

*A. umbonata*

At 615 paces at stream level some large calcareous concretions may be noted. This is exposed for about 30' horizontally & contains

*A. umbonata* c

*H. triquetra*

*P. fragilis*

*L. pennatus*

*C. setigerus*

*M. subulata*

*H. oblongatus*

*L. laura* c



At 800 paces comes the falls. At the bottom of the falls the Shinarump shales are not very fossiliferous and are rather brittle and slightly calcareous.

The falls is 24 or 25' high.

At 25' the rocks break into chunkier fragments and have a decided grittiness to them.

At the very top of the falls the rock is a somewhat hard slightly calcareous shale with few fossils. The forms noted here were *C. coronatus*, *I. cinnatus*.

Above this come 9 or 10' of hard <sup>sandy</sup> shaley limestone that splits into flat slabs with some difficulty. This rock contains a fauna that is decidedly different from that below. These hard shaley ls. are about 16-20' thick if the contact of the Shinarump is drawn at the brink of the falls in the small gully. The 9 or 10' of the walls of the gully belong to the shaley ls. These rocks do not appear like those at Centerfield and are not as fossiliferous. It may be that this "Centerfield" ls. extends in Madison Co. to form the division between the ls. at the St. road and the ls. at Fertileland Stock Farm.

#### Fauna

- ✓ *S. granulatus* c
- ✓ *V. pustulosa* c
- ✓ *I. cinnatus* c
- ✓ *A. princeps* r
- ✓ *Par. hamiltoniae* r
- Cameropectia* sp. r
- ✓ *R. vanuxemi* r
- ✓ *S. perplanus* r

- H. halli* r
- Helenaia* sp
- ✓ *P. oviformis*
- ✓ *Pal. concentrica* <sup>constricta</sup>
- P. rana*
- C. boothi*
- ✓ *R. fimbriata*
- ✓ *S. solenoides*



- ✓ *D. sculptilis*
- ✓ *A. spiriferoides*
- Grammysia* sp.
- Lox. hamiltoniae*
- ✓ *B. lida*
- ✓ *S. inaequistrata*
- ✓ *C. rickman*
- S. rectum*

- M. concentrica*
- ✓ *C. setigerus*
- ✓ *C. coronatus*
- ✓ *N. triquetra*
- ✓ *E. lindblaei*
- ✓ *C. micromatus*
- ✓ *Pal. femida*

At 958 paces above the falls the rocks are very much softer, still calcareous but less so than the rocks below. The very hard rocks went below the stream at 120 paces, also at 120 paces was found *S. rectum*.

At 1023 paces the shales are much softer, filled with *Isomurus* but have practically the same fauna. Here were noted:

- ✓ *I. carinatus* c
- S. angustus?*
- M. concentrica*
- ✓ *S. inaequistrata*

- ✓ *A. spiriferoides*
- ✓ *C. micromatus*
- ✓ *N. concinna*

*H. pustulosa* was found 5' above stream level at 920 paces.

From 1023 - 1128 these coarse shales prevail & contain specimens of *I. carinatus* large & transverse, also *D. sculptilis*.

At 1138 paces the same shales with *E. itys*, *N. concinna*, *S. andaculus*, *S. inaequistrata*. The shales here contain calcareous (impure) concretions.

At 1214 paces along the stream bottom these shales yielded:

- ✓ *Par. hamiltoniae*
- ✓ *S. perplana*
- C. boothi*
- N. concinna*
- ✓ *S. inaequistrata*

- ✓ *R. vanuxemi*
- ✓ *A. spiriferoides*
- ✓ *B. fimbriata*
- P. rona*
- Pal. constructa*
- Pal. concentrica*



*C. setigerus*  
*Aulopora* sp.  
*D. lineatum*  
*S. rectum*

*M. concentrica*  
*C. coronatus*  
*Comanotrichia* sp.

About 2' above this fossiliferous zone come 40' of slaty, fine shales sparse in fossils, & breaking into flat slabs. This sequence is like that in Madison Co. with the Dentland horizon going over into profusely fossiliferous shales and then into dark fish shales sparse in fossils. I imagine that about 3' above 1276 paces here is the end of Cleland's zone D.

At 1276 paces the coarse shales disappear and are here marked by courses of concretions of rather small size. At this point the dark shales come in. They have the appearance of the Skaneateles below.

Fauna of the dark shales

*P. rana*  
*C. buelleri*  
*Orthis* sp.  
*N. triquetra*

*B. reticulata*  
*S. truncata*  
*P. discoides*  
*L. fragilis*

At 1786 paces *L. laura* is common in the shales with *L. fragilis*.

At 1924 paces about 50' of shales are exposed and the dark shales in the stream bed + for about 20' up.

1981 paces and 11' above stream the shale for a short distance is crowded with tiny specimens of *T. carinatus*. Here also were noted *S. truncata*, *L. laura*, *P. rana*.

At 2065 is a cascade in the brook. At 2100 the shales have become rather coarse and pass up into a blue gray



shale like the Earlville shale, when fresh, but weathering to a much lighter blue-grey. The shale below for almost its entire distance give a brownish grey powder when crushed.

At 2144 paces a large concretion in the bed of the stream had *P. stylopora* and *Loxonema* in it. About 4' above stream level at 2275 paces were found *N. triquetrum*, *L. pinnatus* and *C. bellictrata*, *Pal. hamiltoniae*.

At 2409 paces *S. pinnatus*, *C. scitulus*, *C. setigenus*, *C. bellictrata*, *H. dehayi*, *C. bathi*, *I. submarginata*, *G. capillaria*, *B. leda*, *S. perplana*.

At 2478 the shales are softer & more argillaceous. At 2500 these yielded to *hamiltoniae* with concretions forming about it as was noted on Kashong Ck. *C. setigenus* is very abundant and *C. scitulus* is common. *N. corbuliformis* was noted. These shales crumble into small chunky fragments. At 2635 paces these shales in the stream are like those below the *Pleurodictyum* beds and the slopes of the hills along the gully are covered with chips. The shales are now only sparsely *corbuliformis*. These represent the beds above the *Pleurodictyum* beds at Kashong Ck.

*Gemma*

*G. umbonata*

below 15 paces

*N. oblongatus*

*P. fragilis*

At 2932 — *S. fissurella*, *P. punctilifera*, *N. lirata*, *N. corbuliformis*, *N. oblongatus*, *G. umbonata*, *Pal. fecunda*, *N. triquetrum*, *N. pygmaea*, *S. minutum*, *Orthoceras* sp., *Lox. hamiltoniae*, *Pactites aciculiformis*, *C. setigenus*.



At 3200 paces These fissile shales are still exposed for a considerable distance.

At 3274 paces in the dark shales were found:-

*P. discoidum*

*N. triquetra*

*Ambocoelia* sp.

*C. setigera*

Brachyodonta (scattered like those above New Lynn horizon)

*M. subalata*

*I. submarginata*

*I. carinatus* (small)

*M. pygmaea*

At 3351 paces comes the N-S highway but the Tichenor is not exposed on the lake side of it.

At the first intersection from the south of a road leading to the lake there are exposures of these shales.

At 497 paces west of the highway 3 large *Pleurodictyus* were found.

The shales from 250 on are more brittle and resistant under the hammer. Went west in this ravine 1350 paces and found no Tichenor. The ravine is so flat here that any further attempt was abandoned.

The shale at 1350 paces is a rather hard, calcareous (moderately) blue-grey shale quite massive & concretionary in structure. A concretion contained the following:-

✓ *I. carinatus*

✓ *O. carinata*

✓ *N. triquetra*

✓ *I. pennatus*

✓ *Chaetetes* sp.

✓ *P. fimbriata*

*P. rowi*

✓ *A. spiniferoides*

✓ *M. concentrica*

✓ *C. coronatus*

✓ *P. oviformis*

✓ *A. constricta*

*P. rana*

✓ *Goniophora hamiltonensis*

*S. elliptica*



At 1300 paces fully 15' of rock is exposed but is not accessible for collecting. *N. oblongatus* + *S. cuneatus*?

At 1129 paces *S. sinuatus* is abundant. Other fossils are

✓ *C. vicinus* cc

✓ *C. bellistriata*

✓ *S. constricta*

*Amanotocchia* sp.

✓ *Grammysia* sp.

At 1065 paces - *M. mytiloides* + *B. lida*.  
*I. carinatus*, *S. granulosus*.

✓ 1000 paces - *C. tenuistriata*, *S. serplana*,  
*I. carinatus*, *C. coronatus*, *C. bellistriata*,  
*M. pygmaea*, *S. pumatus*,

### Remarks.

The Shencateles in this ravine did not present any unusual features.

The Centerfield ls. here must be quite thick and must include the upper shale beds just below the shale that carries *L. laura*. It is not like the limestone exposed on Shopper Creek, altho it resembles the upper beds there. On the more argillaceous rocks that rests on the "Centerfield" comes a thick series of 50' or more of dark and fissile shales with *L. laura*. No attempt was made to collect these beds as the fauna is meager and is given by Cleland. On this comes the Michelinia zone of Cleland which has coarser shales that break into rather thicker fragments. Fossils in this zone



were not very abundant but the few forms collected seemed to indicate that it was like the beds exposed in the lower part of Kaskaskia Creek and duplicated just below the first falls. On this bed is a reworked of the *Linnæus* zone. This bed is very well exposed in and below the first falls and along the walls of the ravine at Kaskaskia. The Jones on this I have not been able to follow. They require very detailed collecting. The section of rock containing *S. fissurella*, *C. turgida*, *P. fragilis* and *Buchiola* at Kaskaskia and at Big Hollow Creek is quite thick. I should judge about 40'. It is the last rock exposed in the Big Hollow Creek at the highway crossing of the Creek & is exposed also west of the highway for a considerable distance. The last rock observed in the Big Hollow Ravine at 1350 paces and for about 500 paces below this is a hard somewhat calcareous and in some places concretionary shale with *Helix* beds and an abundance of *P. calmaris*. The latter suggests that this is the "First *Atlagis* - *Cypripedium* zone" of Cleland and here as far as my examination was concerned the sequence for this ravine ended. There must be still in the Ludlowville above this horizon 20-30' more of rock enough to accommodate two more zones below the *Indurata*. Further east of the highway and crossing the stream bed not far from the road, but this cannot

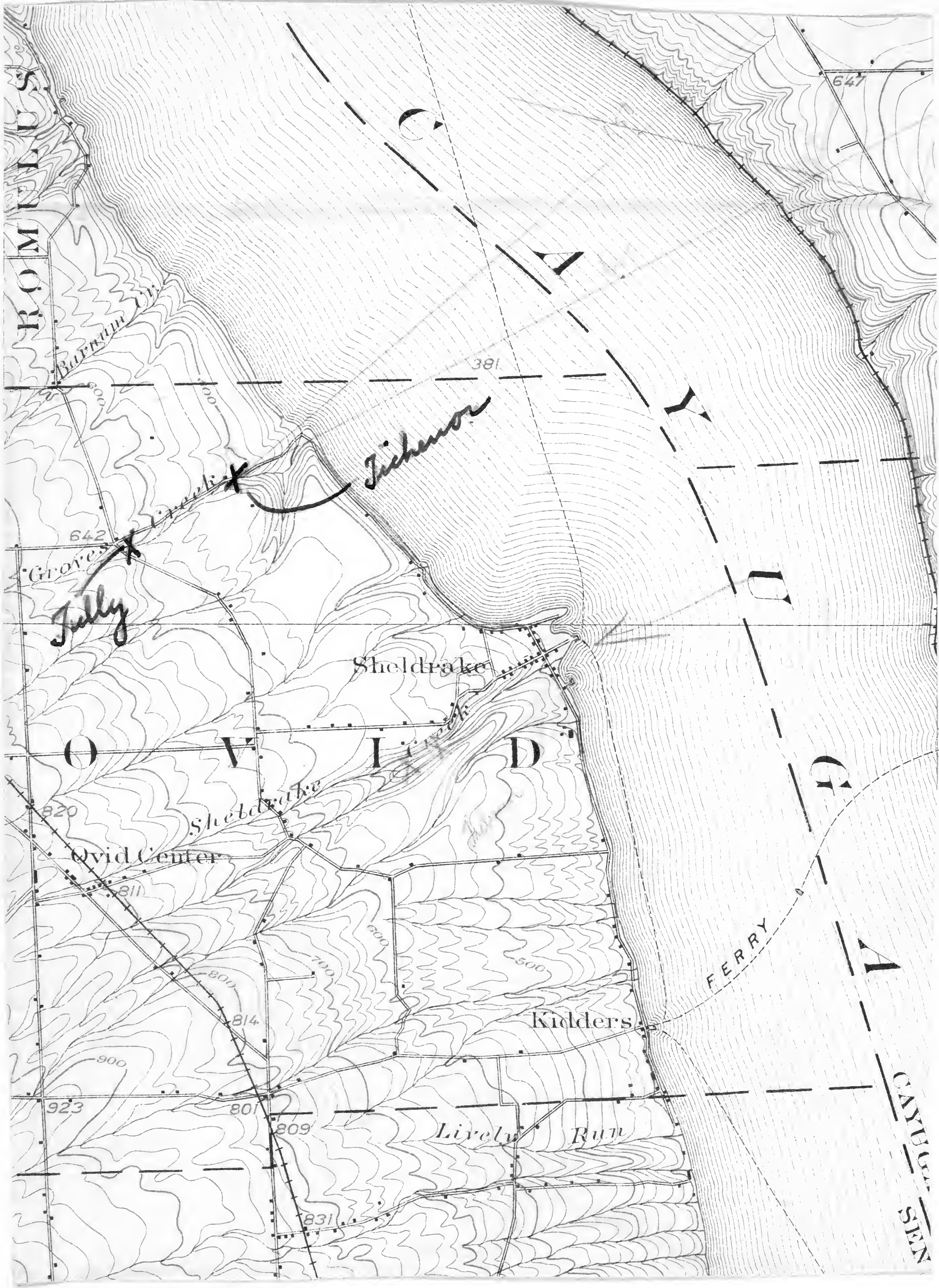


be true from my examination I suspect a small undulation in the rocks here for west of the highway above 500 paces the rocks appear shattered and in places the joints are very closely spaced, so much so as to make collecting a waste of time. The presence of a small undulation would throw the Tichenor far out of line.

It must be kept in mind that three *Platystrophia* of very large size like those of the upper Moscow have been found in the upper Ludlowville at both Kashong and Big Hollow.



88a





Aug 12

Sheldrake Cr. -

From 0-398 paces fissile dark shales representing those found <sup>below</sup> ~~above~~ the *Planoliticulum* beds. These become progressively coarser and more fossiliferous as one progresses up-stream.

*J. carinatus* (very small)

*H. adis*

*Ostracodes*

*N. corbuliformis*

At 398 paces - some loose blocks <sup>from 10' up</sup> allow examination of the fauna:-

*S. pennatus*

*J. carinatus* (elongate)

*C. scitulus* cc

*N. oblongatus*

*C. bellistriata*

The stone at stream level and for 5' above is like that below but somewhat coarser in the way it breaks.

At 484 the shale is dark blue grey but is not calcareous:-

*S. granulosa*

*M. concentrica*

*C. scitulus* cc

*S. pennatus* c

*Pal. plana*

*S. perplana*

*Pal. concentrica*

These are from a boulder slumped down from about 10' up. The real stone in the



lower 5' above stream is a soft dark grey shale, slightly gritty, & it in texture seems transitional between that above & below.

From 520 - 640 - hiatus. The fine, <sup>dark</sup> shale rock has given way to a dark blue-grey stone containing an abundance of *C. scitulus*. At 805 - <sup>101</sup> *A. boydi*, *S. perplanus*, *Grammysia pinnata*, *S. pennatus*, *A. discusata*, *C. scitulus*, *N. triquetus*, *Par. hamiltoniae*, *P. rana*, *S. antostriatus*, *C. corrugata*, *C. bellistriata*, *Lichenalia* sp., *Pal. fenum*, *M. bellistriata*, *P. flabellum*, *Gon. hamiltonensis*, *M. concentrica*, *A. spiriferoides*, *S. perplanus*, *C. indenta*, *M. oviformis*, *H. dehayi*, *C. boothi*, *Grammysia* sp.

At 1014 paces

✓ <i>S. pennatus</i> cc	✓ <i>M. oblongatus</i> r
✓ <i>L. delphinula</i>	✓ <i>A. spiriferoides</i> r
✓ <i>C. scitulus</i> cc	✓ <i>N. triquetus</i>
✓ <i>C. bellistriata</i> c	✓ <i>M. pignora</i>
✓ <i>Bellerophon</i> sp	✓ <i>B. crenistria</i>
✓ <i>Modiomorpha</i> sp.	✓ <i>I. cainatus</i> r
✓ <i>Pal. concentrica</i>	✓ <i>P. radiata</i>
✓ <i>S. granulosa</i>	✓ <i>N. bellistriata</i>

*Orthoceras* sp.

The shale here is rather gritty and a dark blue grey like the shale of Earlville or Red Gate below the ls. At 1088

*C. scitulus* & *C. bellistriata* are very abundant. *S. minutum*.

1088-1170 - hiatus

From 1170 - 1500 paces the same rocks have been traversed and for practically all of the distance either line the sides of the stream or form the bed of it. At 1500 the fauna is somewhat different:



✓ *C. boothi*  
 ✓ *S. pennatus* cc  
 ✓ *C. scitulus* cc  
 ✓ *C. bellistriatus* c  
 ✓ *S. rectum* c  
 ✓ *A. spiniferoides* c  
 ✓ *S. perplana*  
 ✓ *S. perversa*  
 ✓ *S. rana*  
 ✓ *N. liata*

✓ *M. concentrica*  
 ✓ *S. granulatus*  
 ✓ *N. bellistriata*

Along the stream between here and 1678 *S. pennatus*, *A. spiniferoides* & *C. bellistriata* are the most abundant forms. Other fossils noted are

*A. umbonata*  
*Aviculopecten* sp.  
*S. rectum*.

*M. pygmaea*  
*Pal. concentrica*  
*constricta*

At a few places in the falls *A. spiniferoides* and *S. rectum* were noted. A large loosely coiled snail was also seen. The brink of the falls is 77'4" from the bottom at 1696 paces. Horizontally about 25 paces would be taken up by the falls. The rock on the brink of the falls and for 6' above is a hard gritty shale, in places concretionary and calcareous. Fossils are not abundant but the following were seen:

*H. dekeyi*  
*A. princeps*?  
*S. pennatus*

*S. tuthins*? cc.  
*A. spiniferoides*  
*I. carinatus*

At the brink of the falls the Tichenor is 6'6" above the falls. 21 paces upstream it forms a cascade.

The Tichenor is a hard grey crystalline ls. here, 11 inches thick. Fossils noted in it are:— *C. coronatus*, *I. carinatus*, *S. pennatus*, *R. vanuxemi*, a cup coral, *A. spiniferoides*, *Camarotoechia* sp., *S. sculptilis*.



On the Tichenor comes several courses of thin ls. separated by shale layers about 4' in thickness. The fauna of these is given as a whole

*Camarotoechia*  
*I. exigua*  
*Favosites* sp.  
 Cyp corals

*I. carinatus*  
*I. pennatus*  
 Bryozoa  
 sh. 2' 4"

8" sh + ls. } alternation  
 1' 3" } 4' with corals.  
 Tichenor 11"

*I. bellulus*  
*Cyp. harringtonensis*  
*S. granulosa* cc  
*Grammysia* sp.  
*C. vicinus*  
*A. princeps* in sh.  
*C. coronatus*  
*Platyceras* sp.  
*H. deksayi*  
*S. pennatus*  
*R. vanuxemi*  
*P. rana*  
*C. mucronatus*  
*S. perplana*

At 100 paces the topmost goes under the stream. But here on this is still another 2' layer mostly of ls. but with considerable shale and abounding in *S. granulosa*. This makes for the Tichenor a total of about 6' 11"

This upper bed goes under at 162 paces.

The shale above the upper 2' of ls. extends to 198 paces. It contains *R. vanuxemi*, *Grammysia* sp., *I. carinatus*, *P. rana*, *S. granulosa*, *C. congregata*

At 198 1/2' of shale<sup>ls</sup> above stream level belongs to that just described and on this

a thin band of ls. with many fossils: - *I. carinatus*, *R. vanuxemi*, *C. K. penelope*, *Bryozoa*, *P. rana*, *P. stylopoda*

sh  
 4' - 5" shls  
 10" sh  
 1 - 2" ls  
 2' 10" sh  
 1" ls  
 6" sh



Fauna of shale above 4-5" ls. from a slumped boulder:-

*A. spiniferoides* cc  
*P. rana*  
*Ceratopora*  
*C. vicinus*  
*Pal. concentrica*

*Lox. delphicola*  
*M. concentrica*  
*C. setigens*

In the 2' 10" of sh. - *I. carinatus* c, *Taomurus*, *S. pennatus*. In the 1-2" calcareous sh *Hyozoa* & *S. pennatus* are common.

At 300 paces the 4-5" band forms a cascade in the stream and a flat for 35 paces.

At 335 paces blue grey shales are exposed and their fauna is noted here:-

*A. spiniferoides*

*C. boothi*

*S. granulatus*

*H. corbuliformis*

*A. decussata*

*I. carinatus*

*C. mucronatus* c.

*H. triquetra*

*S. pennatus*

are exposed to 363 paces.

383-1360 hiatus

1360 - dark shales with

✓ *I. submarginata*

*H. triquetra*

✓ *M. pygmaea*

✓ *O. lodiensis media*

✓ *L. laura*

*H. lirata*

✓ *P. fecunda*

*H. oblongatus*

✓ *P. emarginata*

*P. constricta*

*Modiomorpha* sp.

*C. boothi*

✓ *C. setigens*

*Orthoceras* sp.

*P. rana*



1460-1565 hiatus

At 1575-1585 are shales. That are non-columnar but are not so brittle and do not break into the thin pieces like those below. There is also a change in the fauna here:-

*L. laura* c  
*S. andaculus*  
*A. spiniferoides* c  
*S. rectum*  
*T. submarginata*  
*P. stylopsa* var.

*Amplexus*  
*A. reticularis*  
*C. bellistrata*  
*R. penelope*  
*Lingula* sp.  
*H. oblongatus*

At 1800. paces comes the falls over the Tully just below the road.

The basal layer of the Tully here is 36" thick and make the total exposed rock as 12' 7". A dam has been built on the Tully just west of the highway bridge and this may obscure some of the layers.

~~16' falls in Tully. about 16' of it the out?~~  
 16' falls probably memory P

1460  
1565  
1575  
1585



## Groves Ck.

See p. 88a for map

The "Enormal" beds are like those at Sheldrake and consist of alternations of ls and shales to the extent of about 10' 10". In them *S. carinatus* was abundant. At 66 paces the hardest of these goes under the stream but at 77 paces is a sequence similar to that at 198 paces on Sheldrake Ck. Here on a hard bed containing *S. granulosa* in abundance come 2' 3" of dark blue grey sh., then a thin band of calcareous sh. with many fossils, then 1 1/2 sh. which is blue black, then 1" calc sh., mounted by a foot of sh. with abundance of *S. pinnatus* and *S. carinatus*, then 13" hard shale mounted by shales with *C. mucronatus* corals and *A. spiniferoides*.

At 518 paces *A. umbonata*, *P. rana* *A. spiniferoides*, exposed for 20 paces.

518-595 liateks

595-643- *A. umbonata*, *P. rana* *C.*

840-855 - a small exposure with

*A. reticularis*, *S. granulosa*.

921 a hard calc. band and on this shale is exposed to 982 paces. The shale at 995 is becoming darker and that in the banks above is fissile. The shales from 921 to 975 carry *A. reticularis*, *S. rectum* & *S. granulosa*.

At 1025 they are the dark little sh. At 1109 comes the falls - 1109 is 10' 10" above 1026 pace. The dark fissile shales are 15-20' thick for about 5 1/2' above 1109 they have disappeared. Fauna of the light blue grey shales below the falls.



- |                              |                                 |
|------------------------------|---------------------------------|
| ✓ <i>R. vanuxemi</i>         | ✓ <i>P. stylopora</i>           |
| ✓ <i>S. andaculus</i>        | <i>P. concentrica</i>           |
| ✓ <i>S. rectum</i>           | ✓ <i>R. fimbriata</i>           |
| <i>N. corbuliformis</i>      | <i>C. bellistriata</i>          |
| ✓ <i>A. spiriferoides</i> c  | ✓ <i>S. mearnsi</i>             |
| ✓ <i>A. reticularis</i>      | ✓ <i>S. angulatus</i> bottom    |
| <i>Jaomurus</i>              | <i>J. carinatus</i> at 32' from |
| ✓ <i>Cyrt. hamiltonensis</i> | <i>S. inaequistriata</i>        |
| ✓ <i>Chaetetes</i>           |                                 |

The falls is 43' 4" to the bottom of the Tully from 1109. About 2' below the Tully the following fossils were found: -

- |                          |                     |
|--------------------------|---------------------|
| <i>S. inaequistriata</i> | <i>R. vanuxemi</i>  |
| <i>J. carinatus</i> c    | <i>C. setigerus</i> |
| <i>S. andaculus</i>      | <i>S. rectum</i>    |
| <i>A. reticularis</i>    | <i>C. incusata</i>  |
| <i>D. lineatum</i>       |                     |
| <i>M. concentrica</i>    |                     |

The uppermost 2' of shales below the Tully are black and very fissile.  
*C. scitulus*, *S. murinum*

Remarks on sections visited  
Aug 11-12.

The Ludlowville seen at Bloomer's Crk & Sheldrake reflects the sandstones of the east. The beds are usually a shale rather like the Enslville shales but not quite as dark. I cannot place these beds of the upper Ludlowville in the Madison Co. section, unless it be in the shales that lie on the N. quarry.

The "Principal" beds in the three ravines visited are all quite similar showing a hard band at the



bottom that is nearly one foot thick and above this shale and Crinoidal ls. alternations for 10' or more. *C. impressa* was only found at Bloomer Creek. Above the Encrinural beds the shales contain an abundance of *S. pennatus* + *S. carinatus*. On these bed come shales carrying *A. spiniferoides* and these go over into beds that carry *A. reticularis*, *A. granulosa*, *R. perelope* + at Bloomer Crk. *A. spinosa*, also *S. rectum*. Then follow more Ambocoelias, then fine fissile shales with *O. lochei*, *media* and *L. luma*. These give way to lighter shales with *A. reticularis* and large *Spirifers*, also *S. rectum*. Finally the shales carry lentils with many bryozoa. In all of the ravines so far examined there has been a dark fissile shale zone of varying thickness below the Jelly. At Groves Crk. it was only 2' thick but at Rushong Cleland says 7'. The transition from the blue shales to the black is quite abrupt.

At Groves the Jelly that was exposed in the quarry measured 13' 4". The lower layer was 40" thick.



August 10

Bloomer Creek

Along the shore and slightly south of Bloomer Creek are cliffs of dark shales which crumble rather readily. They are non-calcareous. The higher beds about 15-20' above lake level crumble into rather stout irregular pieces. Fossils observed in these rocks are:-

✓ <i>B. retrostriata</i>	<i>S. fissurella</i>	<i>M. pygmaea</i>
<i>P. discoidium</i>	<i>C. setigera</i>	<i>B. lida</i>
✓ <i>N. oblongatus</i>	<i>S. truncata</i>	<i>I. carinatus</i>
<i>P. rana</i>	<i>P. punctilium</i>	<i>A. bodianensis</i>
✓ <i>N. triquetra</i>	<i>Lox. hamiltoni</i>	<i>Ostracoda</i>

The *I. carinatus* are all very small (seedlings) and the *Lox. hamiltoni* has a concretion forming about just as indicated below the first falls at Kaskong Cr. These beds along the shore at this point belong to the shales that lie on the Michelinia zone at Kaskong Creek.

Below

150 paces upstream there is a small exposure of these shales, much jointed. Here *L. exilis*? and *S. truncata* were abundant. Also *S. pennatus* & a small *Leptæna* were observed. These shales resemble one strongly of those on top of the hill along the Eaton road in Madison Co. Wood fragments also occur.

At 350 paces and a bunch of blocks from about 100' above the stream affords an opportunity to examine the contents. These shales break into larger fragments than those below. They are not greatly fossiliferous but contained: *C. boothi*, abundance of *C. setigera*; *B. lida*, *Lox.*



hamiltoniae, *N. triquetra* and *S. pennatus*. The latter is the same ornate kind with long wing points, as seen in the upper Eaton shales.

490-500 faces an exposure of the shales which now break into large slabs and are not unlike the Edville shales. These shales break into blocks often with a curved surface so that one face may be squarish but the others taper to an acute  $\angle$ . These yielded for about 10' up an abundance of *C. scitulus*. Other fossils noted were *O. parvula*, *N. bellistriata*, *Lox. hamiltoniae* (with concretion) *S. pennatus*, *C. boothi*.

500-687 - hiatus

At 687 faces the shales are hard under the hammer & gritty to the teeth. They give only a slight effervescence with acid. Fossils:

✓ <i>A. umbonata</i>	<i>S. perplana</i>
✓ <i>S. pennatus</i> (very transverse)	<i>N. oblongatus</i>
✓ <i>J. submarginata</i>	<i>Pal. constricta</i>
✓ <i>C. bellistriata</i>	<i>N. hiata</i>

740-781 - dark blue-grey massive shales. These shales leave the stream bed very irregular when the larger blocks are plucked out leaving deep scars, pits and pockets. Fossils are not abundant but the following were noted:

✓ <i>N. triquetra</i>	<i>M. pygmaea</i>
✓ <i>S. pennatus</i>	✓ <i>C. bellistriata</i> c
✓ <i>N. lirata</i>	✓ <i>A. spiriferoides</i> or
<i>B. leda</i>	

840 - about 30' vertical + 50' horizontal of rocks exposed. The stone that has fallen into the stream is a darker shale than that at 781.



890-900 paces - sparsely fossiliferous dark shales. Fossils in stream bed & up to 5' above stream level:-

- ✓ *N. corbulariformis*      *M. pygmaea*
- ✓ *A. umbonata* (small)
- ✓ *S. pennatus*
- ✓ *N. triquetus*

The shales in the stream bottom have the concentric structure & appearance of the soft shales on the *Michelinia* beds. Above they appear coarser.

982 paces - 2 ravines intersect - large exposure. The lowest shales here are like those below and yielded an abundance of *M. pygmaea* but little else. By abundance here is meant that more of *M. pygmaea* than any other fossils were found. *N. oblongatus*, *N. corbulariformis*, *N. triquetus*.

At 1072 & 1150 the same soft shales - at the latter place were found *Pal. concentrica*, *N. triquetus*, *N. corbulariformis*.

at 1123 the shales in the stream bed are exposed for about 30' and yielded:-

- ✓ *M. liata*      ✓ *S. pennatus*
- ✓ *C. scitulus*      *Orthis* sp.
- ✓ *O. carinata*      ✓ *N. oblongatus*
- ✓ *O. parvula*      ✓ *N. triquetus*
- ✓ *Modiomorpha* sp.

1230 comes a fall; the trail would be at about 1250 paces. The shales here are massive and in places quite calcareous. The fall was measured to be 54' 7" high. This massive shale must include the second



Cypriocardella - Atypus zone of  
Cleveland. Collecting here in the upper  
30' was not possible due to the  
steepness of the cliffs.

Fossils below falls.

- |                                    |                           |
|------------------------------------|---------------------------|
| ✓ <i>I. carinatus</i>              | <i>L. ligo</i>            |
| X <i>Grammysia constricta</i>      | ✓ <i>C. vicinus</i>       |
| ✓ <i>Pal. constricta</i>           | <i>Lepidodendron</i> sp.  |
| ✓ <i>M. concentrica</i>            | ✓ <i>C. coronatus</i>     |
| ✓ <i>M. triquetra</i>              | <i>Grammysia</i> sp.      |
| <i>L. orbiculatus?</i>             | ✓ <i>Cryptonella</i>      |
| ✓ <i>C. bellistriata</i>           | ✓ <i>S. arctostriatus</i> |
| ✓ <i>S. pennatus</i>               | <i>Lox. delphiola</i>     |
| <i>Aviculapecten</i> sp.           | <i>Par. hamiltoniae</i>   |
| ✓ <i>Soniphora</i> sp.             | ✓ <i>E. lincklaeni</i>    |
| <i>Modiolopsis</i> sp.             | <i>Ligula</i> sp.         |
| <del><i>Pal. concentrica</i></del> |                           |

On the bank of the falls is a layer of ls.  
seven inches thick. It is fine grained and  
light grey, and contains an abundance of  
fossils.

- |                        |                      |
|------------------------|----------------------|
| <i>H. deparvi</i> cc   | <i>A. princeps</i>   |
| <i>I. carinatus</i> cc | <i>S. perfoliata</i> |
| <i>C. boothi</i>       | Ostracods            |
| <i>C. setigerus</i>    |                      |
| <i>C. bellistriata</i> |                      |
| <i>C. coronatus</i>    |                      |

On this comes a soft shale for a  
few inches, then about 1/2' shaly  
ls with a prolific fauna.



*P. stylopoda**S. granulosa* c.*R. vanuxemi* c*S. pennatus* r*C. coronatus* r*C. impressa* cc*P. rana* c*Camerothechia* sp r*T. carinatus* r*Platyceras* sp r*S. perplana* r*M. concentrica* r

40-65 paces above falls, is a blue shale 1'-1 1/2' thick on the ls described above. This ls. is coarse granular in places from crinoid remains but breaks into irregular layers 2-3" thick separated by thin layers of shale. This goes under the stream 28 paces from the bridge.

The shale on it is soft light blue-grey and contains:-

*A. umm.**S. pennatus**T. carinatus**S. granulosa**S. perplana**Cyrtodictya*

A thin ls. band comes on top of this shale at 50 paces and crosses the stream at 66. At 96 paces 6" of shale in the stream bed are separated from 6" more by a thin (2") seam of shaly crinoidal stone. The upper 6" of shale is separated from 1' of shale by a 1/4" band of hard sandy shale. This latter is slightly calcareous and contains *C. scitulus* & *S. pennatus*, *Lox. delphicola*. up to 175 paces coarse shales continue & contain also *T. carinatus*.

From 200-257 paces the stream is lined by about 1/2' of shales containing:-

*A. umbonata* cc*C. bellistatus**A. spinifrons**P. concentrica**C. scitulus**C. coronatus**S. granulosa**C. vivinus**C. coronatus**R. vanuxemi*



Par. hamiltoniae Corals.

At 243 paces *A. umbonata* is very abundant in patches. Also *Prana*. Other fossils are *P. mutans*, *P. tenuis*, *P. discordans*. These shales are soft & dark grey. The *C. vicinus* *A. spiniferoides* layer is succeeded by this *Ambocoelia* band. *C. setigerus*. *N. lirata*

This band is terminated at 287 paces by a ls band composed almost wholly of shells. It has:-

*A. spiniferoides* c.c. *R. vanuxemi*  
*S. tellus*  
*A. umbonata*

In the shales above this (at 290 come:-

*Prana* *Mediomorpha* sp.  
*N. triquetra* *C. vicinus*  
*S. acrostriatus* *A. umbonata*  
*C. bellistriata*  
*Pala. constricta*

300-347 - *liratus*

347-407 - *Ambocoelia* still very common.

Also present are - *Pala. constricta*, *N. triquetra*, *C. mucronatus*, *O. lodinensis*, *media*, *Pholidops*, *hamiltoniae*, *M. pygmaea*

*C. coronatus* } at 450.  
*C. setigerus*

at 495 a large block of dark grey shale has fallen from about 8' above stream level. It contains:-

*C. boottii* *A. reticularis*  
*R. fenelope* *A. spinosa*  
*A. spiniferoides* *R. fimbriata*  
*Cystodictya* sp. *S. junia*



✓ *N. biata*  
 ✓ *Pal. constricta*  
*P. rana*  
 ✓ *M. concinna*  
 ✓ *C. bellistriata*  
 ✓ *M. pygmaea*  
*S. cratulum*  
*S. granulosa*  
*Goniatite*  
 ✓ *I. submarginata*  
 ✓ *C. coronatus*

✓ *S. inaequistriata*  
 ✓ *S. andersoni*  
 ✓ *M. concentrica*  
 ✓ *S. pauplana*  
 ✓ *N. oblongatus*  
 ✓ *S. cheungensis*  
 ✓ *L. rostellata*  
*Aviculapecten*  
*Pterinopecten*  
 Coral.

At 648 paces

✓ *Cystodictya*  
*Didophyllus*  
 ✓ *Amplexus*  
 ✓ *A. spinosa*  
 ✓ *A. reticularis*  
 ✓ *Pal. <sup>constricta</sup> concentrica*  
*Spinifer. sp.*

✓ *S. inaequistriata*  
 ✓ *A. spiniferoides*  
 ✓ *C. bellistriata*  
 ✓ *M. concinna*  
 ✓ *M. concentrica*  
 ✓ *R. fimbriata*  
*R. penelope*

The shale here weathers to a light grey.  
*P. rana*  
 ✓ *S. granulosa*  
*S. rectum*  
*R. fecunda*

at 780 the road.

89 paces west of road the shales have:-

*A. umbonata*  
*S. scitulus*  
*C. boothi*

*Pal. constricta*  
*Stegoceras*

194 & 209 paces *A. umbonata* common  
 also *P. rana*. Shales soft.



319-396

*C. coronatus*  
*C. reticularis*  
*H. concinna*  
*S. rectum*  
*C. spiniferoides*

*S. granulosa*  
*R. oamaruensis*  
*S. jinia*  
*S. concava?*

495 in. Stream bed

*S. granulosa*

535-573 paces shales dark & fissile  
 at 573 a loose block has *L. laura*.  
*O. lediensis media* at 573 am place.

At 688 paces these carry *L. laura* and  
 extend vertically about 15'.

At 1130 blue grey shales are exposed  
 for about 30'.

At 1210 the shales are coarser and  
 break into heavier pieces. *S. channingensis*,  
*C. pleurotomaria*.

At 1370 there are 16' up to the base of  
 the Tully these are blue grey shales with  
 thin seams of ls. The fossils are:-

<i>C. coronatus</i>	<i>C. reticularis</i>	<i>R. oamaruensis</i>
<i>S. concava</i>	<i>Cystodictya</i>	<i>S. decussata</i>
<i>S. pennatus</i>	<i>S. rectum</i>	<i>H. deKayi</i>
<i>P. lineatum</i>	<i>S. Mearnsi</i>	<i>Crus. ham.</i>
<i>Pod. constricta</i>	<i>E. bellistruata</i>	<i>M. concentrica</i>

This fauna occurs to about 5' 6" below  
 the Tully when the shales are dark  
 and fissile and have *M. subumbona*  
 & *S. minutum*.

I make the Tully 11' thick. The lowest  
 bed is about 4' thick. The mass is  
 crumbly and not unlike that at  
 Kashiwa. *H. cuboides* was found in  
 the dirt below the bottom where the



slate had been excavated out. The lower portion in contact with the Moscow is quite shaly suggesting a transition. *M. subumbonata* was also found here.

The shales immediately below the Moscow are not well exposed and are mostly covered, however their dark clays are shown over the slopes.  $6\frac{1}{2}'$  of fully are exposed in the face of the falls and about  $4\frac{1}{2}'$  in cascades above.

1117 paces the shales have

<i>C. constricta</i>	<i>Spinifer</i> sp.
<i>S. multum</i>	<i>Par. hamiltoniae</i>
<i>C. undata</i>	<i>Lox. ham.</i>

and have changed to a less fissile stone showing transition to the rocks above.

1310  
491

879 - *P. emarginata* in the soft fissile sh.

730 the fissile shales are closely jointed by sets running NW + another almost at rt. ls.

At 475 paces the coarser shales with *S. ananios*, *a. spiniferoides*.

In the sh. about 10' above the ledge along the road *D. corroborens* was noted.



Bowdoin landing 8 mi S. of Skan. - for  
Hemalomonites

Dean Cr. and the Shore sections.  
August 14.

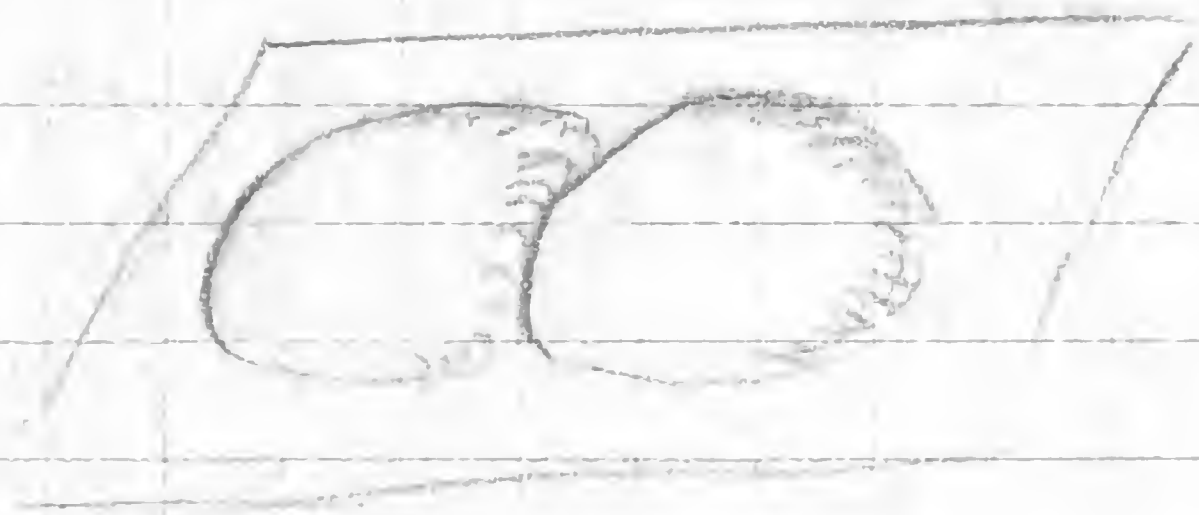
296 paces south along the railroad  
a small cut permits access to the  
shore. Here are exposed 16' of shales that  
are dark grey in section and quite  
calcareous. On the weathered surface they  
are a lighter grey. They are very irregularly  
jointed (as all such of these shales in  
the Hamilton are). In places masses  
with a curved surface can be broken  
out. The shales crumble readily into  
small flat fragments. Some of the  
joint surfaces are covered with rust  
from decomposed pyrite. These shales are  
distinctly grey and in no sense can be  
taken as black. Fossils are exceedingly  
rare. *P. discoides*

On Luther's map these shales on the  
shore are very close to the Cardiff-Skan  
contact and are indicated as Cardiff. Some  
of the beds on the beach proper are rather  
hard.

At 484 paces comes the beginning of the  
cliffs on the east side of the railroad  
track. At this place also a stairway  
permits examination of the shales for  
some distance. The shales here are for  
20' vertical dark grey weathering to lighter  
they give a vigorous effervescence with acid.  
Fossils are again very rare only a  
*Paranema* and *A. umbonata* were noted

In places where these shales break out  
of the bedding surfaces will include  
low rounded protuberances like a  
flattened botryoidal surfaces. This is





surface of a piece of sh.



what I believe is meant by concretionary structure in the sh.

At 630 paces the shales are very dark grey almost black & contain few fossils. *S. pinnata*, *Bactrites*, *Orthis* sp. These gave practically no effervescence with acid.

At 703 paces 5' above the tracks - *S. pinnata* + *Ostracodes*.

830-10' above the tracks - *P. fragilis* and a *Leiorhynchus*, probably *Laura*, also *P. discoidemum*. The shale here is very fissile where it is greatly weathered and falls to a powder or to thin flakes. At the bend where the railroad and highway diverge slightly about 50' vertical of rocks are exposed. From 1100 or 1200 paces on the rocks above are lighter colored and give a vigorous effervescence with acid. The shales in this whole sequence are very unfossiliferous along the railroad. The lighter upper shales are calcareous. The rocks are not exposed beyond 1500 paces from the Levanina station. It is 1725 paces to Glen Creek.

### Deans Creek

500 paces from highway the first exposure consists of ashen grey calcareous, soft shales that are dark grey on the fresh fracture. These contain only a sparse fauna. *L. Laura*, scattered & distant, *P. discoidemum*, *Orthis*.

At this place a concretion was found that contains sphalerite as well as Galena. These are exposed to 573 paces & for 15' vertical.

573-715 liates

at 715 <sup>-764</sup> paces come shales like those



below.

764-830 lietus

830-840 paces. some

Between here and 1100 come a few outcrops which have the same kind of shales. 1100-1130 - *C. scitulus*, *P. fragilis*, *P. discoidium*, *L. laura* - some are abundant.

*B. retrostrata* & *Bygonia* were noted in a loose piece.

1155-1186 - similar shales.

1215-1240 - shales are medium blue-grey and . . . They contain *L. laura*, *N. triquetra*, and *B. leda* (with clayey concretion)

1338 - *P. constriata*, *H. subulatum*

At 1465 about 15' of shales are exposed which have broken into large blocks that split rather easily into slabs or similar masses. Here, all the fossils, are not common, they are more abundant than they have been elsewhere.

*S. exotolum*?

*P. fragilis*

*P. discoidium*

*B. leda*

*Bactrites* sp.

*H. corbuliformis*

*H. oblongatus*

*H. triquetra*

*L. laura*

Ostracods

*S. fissurella*

*C. scitulus*

*P. punctilifera*

*L. curtum*

1548-1581 in stream bed - dark concretionary shales with *S. fissurella* & an *S. minutum*. Some loose slabs here, probably from above where about 15 or 20' are exposed are very fossiliferous and contain:-

*A. umbonata*

*L. laura*

Bygonia

*S. exotolum*

Gonophoceras?



at 1657 is a massive shale in the stream bed that is prolific in *S. crotatum*, *R. dissiduum* and snails. Also it contains *M. pygmaea*, *N. triguter*, *A. decussata*, *N. orbiculiformis*, *M. subalata*, *S. arctostriatus*, *L. capillaria*, *A. spiriferoides*.

1781-1836 - dark shales, brittle, concretionary with *L. laura*. Rock exposed here 30' up.

1870-1900 - dark shales abounding in *L. laura*. Also noted were *N. triguter*, *A. decussata*? *L. laevis*?

2073 and 2075 - large exposures of sh. Outcrops are practically continuous from 2075 to 2070. From 2040-2070 is a large exposure, the shales in the stream bed + a foot above are crowded with *L. laura*, in some cases so much so that the shale appears to be made up of this shell. Other fossils are *A. decussata*, *A. truncata*.

A loose slab had *Holopea*-like snails, *A. umbonata*, small bryozoa *A. decussata*, *L. laevis*, *M. pygmaea*, *L. curtum*, *C. setigenus*.

The shales along the stream here are very dark, split easily into thin pieces and are slightly calcareous.

2430 - *L. laura*, *Leptæna*, *Ambocelia umbonata*, *N. triguter* in a dark sh. Also *E. regulata*?

At 2567 a hard band forms a small cascade in the stream. This is composed of a calcareous shale that crumbles into small fragments under the hammer. This is about 6" thick and has many fossils. *N. triguter* is very abundant as are snails.



Other forms are *M. pygmaea*  
*Orthoceras* sp., *C. scitulus*.

Above this are the same  
 shales as below. When dry they are  
 light gray but when damp are very  
 dark. At 2827 paces they are blue  
 gray and only faintly calcareous.

*L. laevis*

*O. minuta*?

*L. laura*

Crinoid stems

*P. fragilis*

*E. rugulata*

At 3025 paces a broad level can be  
 used. Here the stream forms a  
 cascade over the shales and a gorge.  
 On the N.E. the shales tower above  
 to fully 80'. Probably among them  
 is the Kentfield ls.

11' up fossils are - *M. subulatus*  
*M. pygmaea*, *N. triquetra*, *P. fragilis*,  
*brachio*, *S. pinnatus*.

In about 125 paces 38' vertically  
 were traversed and this carries me  
 to 3150 paces upstream. Concretions  
 were noted in the shales about 50'  
 up at the cascade.

3253 a small exposure carries large  
 oval calcareous concretions and many  
 fossils - *L. laura*, *M. subulatus*, *C. scitulus*,  
*M. pygmaea*, *N. subulatus*, *Spirifer* sp.,  
*N. triquetra*, *Leptæna* sp., *Orthoceras* sp.

At 3287 a smaller exposure yields  
*A. umbonata* c., *P. discoides*, *M. oblongatus*,  
*N. corbuliformis*, Crinoid stem fragments.



At 3622 paces comes the falls with the centerfield on top. At 43' 4" feet above the 3622 paces comes top of falls.

See shales in the first 5' 3" carry *L. lamina* c, *P. fragilis*, some of the *F. lamina* are pyritized.

5' 5" - 10' 10" - same

10' 10" - 15' 15" - *R. fimbriata*,

15' 15" - 20' 20" - *A. umbonata*, *C. mucronatus*, *Cyrtina lam.*, *P. fragilis*, *C. boothi*, *Pol. concentrica*

20' 20" - 25' 25" *C. bellicata*

The brink of the falls is at just 8 steps up which is 43' 4". The fauna of these calcareous shales & ls. on the top of the falls is as follows: -

- |                           |                                          |
|---------------------------|------------------------------------------|
| ✓ <i>C. indenta</i>       | ✓ <i>C. setigerus</i>                    |
| ✓ <i>P. rana</i>          | ✓ <i>M. coriinna</i>                     |
| ✓ <i>A. terebratulid</i>  | ✓ <i>C. vicinus</i>                      |
| ✓ <i>T. carinatus</i>     | ✓ <i>Bryozoa</i>                         |
| ✓ <i>A. serpens</i>       | ✓ <i>A. decussata</i>                    |
| ✓ <i>Chaetetes</i>        | ✓ <i>S. inaequistriata</i>               |
| ✓ <i>Spiner obvinatus</i> | ✓ <i>C. incisurata</i>                   |
| ✓ <i>S. andaculus</i>     | ✓ <i>C. boothi</i>                       |
| ✓ <i>Leiopteria</i>       | ✓ <i>C. boothi</i> var <i>collitiles</i> |
| ✓ <i>A. crinoid</i>       | ✓ <i>M. haskinsi</i>                     |
| ✓ <i>A. spiniferoides</i> | ✓ <i>V. pustulosa</i>                    |
| ✓ <i>M. triquetus</i>     | ✓ <i>Par. hamiltoniae</i>                |
| ✓ <i>C. setulus</i>       | ✓ <i>M. subumbona</i>                    |
| ✓ <i>Goniophora lam.</i>  | ✓ <i>R. fimbriata</i>                    |
| ✓ <i>S. arctostriata</i>  | ✓ <i>C. coronatus</i>                    |
| ✓ <i>R. cyclus</i>        | ✓ <i>D. sculptilis</i>                   |
| ✓ <i>R. penelope</i>      | ✓ <i>M. concentrica</i>                  |
|                           | ✓ <i>E. lincklaeni</i>                   |
|                           | ✓ <i>S. perplana</i>                     |



At the top of the falls there are about 4' more of these calcareous shales making, from where the *R. pinnata* was found 25 or 30'. These break readily and fall to small fragments on exposure.

135 paces upstream <sup>from the falls</sup> and just under the bridge of the former road came the dark fossil shales of the Lower Ludlowville (3rd Leichlynus zone). These are exposed for some distance up the stream. The stream intersects the road at about 300 paces from the bank of the falls. In the upper part of the lower upstream from the upper highway crossing, dark fossil shales were exposed and these were also taken to be those of the upper Ludlowville. No attempt was made to collect any of the Ludlowville beds except the Centerfield.



Aug. 10.

Paines Creek.  
Moonshine Falls.

1st 5'5" - shale soft silty,

*I. Cana* *A. media* *P. fragilis*  
5'5" - 10'15"

10'15" - 15'15" - Shale is coarser and  
contains *A. umbonata*, *P. Cana*, *C. boathi*,  
*C. crinita*, *P. Cana*, *P. Cana*, *P. Cana*, *P. Cana*,  
*P. Cana*

15'15" - 20'20" - Shale still coarser, weather  
blue grey.

*A. constructa*

*P. Cana*

*P. Cana*

*M. piper*

*A. Cana*

*C. Cana*

*R. Cana*

*A. Cana*

The boundary is apparently established  
between 15'15" & 20'20". We shall take the  
15'15" mark as it showed the first  
evidence of change.

20'20" - 25'25" - coarser than shale, weather  
blue grey, fossils abundant.  
*A. Cana* *C. Cana*

25'25" - 30'30" - Hard shale

*M. Cana*

*P. Cana*

*A. Cana*

*C. Cana*

*P. Cana*

*A. Cana*



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 20000
 \end{array}$$



30'30" - 35'35" - 11' - Top of falls, as the rock  
 as in lower section. *Cheloniceras* at top of falls.  
*Favosites* *Planorbis* *Planorbis*  
*I. dipyrus* *I. dipyrus* *V. pustulosus*  
*R. fimbriata* *I. neocosta*  
*P. marginata* *C. vicinus*  
*P. rowi* *P. marginata*

There are 256 paces from the mouth of the  
 falls to the highway bridge, the *Centrifugal*  
 contact comes ~~about~~ 122 paces  
 upstream from the falls. From the bank  
 of the falls to the contact (122 paces) is one  
 hard level step, and 16' of bedrock are  
 exposed to the bridge. The *Centrifugal* is  
 estimated here to be 30 feet thick.

125 paces upstream from the bridge a  
 falls appears. The *Centrifugal* is 10  
 paces upstream. The top of the *Centrifugal*  
 comes about 27' above the top of Moonshine  
 falls. The dip is 27' and about 45 paces  
 or 135' to the west and north.  
 at 468 the top of the *Centrifugal* is 15' above  
 stream level. At 600 paces it forms  
 a 3' cascade in the stream, and then  
 disappears. <sup>at 12 paces</sup> The top of this  
 cascade is about 30' in the stream  
 above the bridge. The *Centrifugal* is  
 apparently a low arch here, one limb  
 of which is dissected by the stream. The  
 dip is generally to the north and west.  
 At the cascade the rocks have  $N69E 5^{\circ}NW$   
 The bedrock is exposed at 600 in a cliff  
 40 feet high. A bedding plane of the  
 bedrock dips 10 upstream (and component)



325

340  
325



Fossils in the Ledyard are:

<i>L. clausa</i>	<i>Panetia</i> sp.
<i>A. media</i>	<i>N. trigaster</i>
<i>P. fragilis</i>	<i>P. rana</i>
<i>S. discuscula</i>	<i>S. submarginata</i>
<i>S. truncata</i>	<i>N. oblongatus</i>
<i>S. pinnatus</i>	<i>L. drecks</i>
<i>N. pygmaea</i>	<i>Pal. constructa</i>
<i>N. corbularis</i>	<i>S. nitrocostata</i>
<i>S. cuneatus</i>	<i>M. subulata</i>
<i>Spirifer</i>	

Ledyard

At 200 paces the Ledyard is again exposed from 600-800 the cliff of sand is 40-60 feet high perhaps higher. At 1013 Ledyard is 3' above stream level. At 1157 the Ledyard is in the stream with a dip to the south 1199 - Ledyard exposed.

1202 - 1255 - covered

At 1455 - top of Ledyard

The Ledyard ends at about 3337 paces. The shale above it weathers to a light grey and has

<i>L. exigua</i>	<i>S. rana</i>	<i>P. rana</i>
<i>A. grandiosa</i>	<i>M. acuta</i>	<i>S. cuneatus</i>
<i>R. fimbriata</i>	<i>C. bellistata</i>	<i>M. concentrica</i>
<i>C. scutellus</i>	<i>P. oviformis</i>	<i>L. pumila</i>
<i>A. depressa</i>	<i>A. spiniferoides</i>	

They zone almost disappear about 3575 the Pleurodictyon were seen.

In the succeeding shale well preserved *Spirifer* are common. The shale is somewhat more crumbly than in the zone below.

3732 - 3900 - covered

3900 -



$$\begin{array}{r} 55 \ 55 \\ 27 \ 0 \\ \hline 57 \ 55 \end{array}$$



at 4037 from a rock shale 10' above  
dredge level seen.

*I. caninatus*  
*R. grandis*  
*C. bellistriata* C  
*M. septiflorus*  
*M. concentrica*

The shale is coarse and sandy

4370 - coarse sand - depth 20' high.

4420 - 45' - coarse

4520 - coarse sandy shale

3' above stream - 2 specimens of *Bygonia*  
abundant in fossils.

<i>A. sinifidula</i>	<i>E. septiflorus</i>
<i>I. scithus</i>	<i>M. concentrica</i>
<i>R. vancouverii</i>	<i>P. cana</i>
<i>P. bowensis</i>	<i>A. septiflorus</i>
<i>H. vancouverii</i>	<i>M. levata</i>
<i>P. glabellum</i>	<i>Mon. harringtonensis</i>

About 4000 - coarse sandy shale

At 4100 is a stop for the dark shale  
fossils at stream level are:

<i>C. bellistriata</i>	<i>A. sinifidula</i>
<i>I. caninatus</i>	<i>S. scithus</i>
<i>A. grandis</i>	

Concretions are abundant here

It is 5000 paces to falls over Lishan  
which is 64 feet high to the  
Lishan. The falls itself is not more  
than 50' high.







August 12

## Tributary to Paynes Creek

Rock exposed at the junction of Paynes and the tributary is the Ledger shale.

0-5'5" - 31 paces of Ledger  
 5'5"-10' - 42 " - covered  
 10'10"-15'15" - 76 " - covered  
 15'15"-20'20" - 45 " - covered  
 20'20"-25'25" - 50 " - Ledger  
 25'25"-30'30" - 54 " - "  
 30'30"-35'35" - 75 " - "  
 35'35"-40'40" - 69 " - "  
 40'40"-45'45" - 69 " - "  
 45'45"-50'50" - 55 " - "

The shale here is somewhat coarser than that below suggesting that it marks the termination of the Ledger. The rock shows evidence of deformation.

50'50"-55'55" - 66 paces - Ledger  
 55'55"-60'60" - 79 " - "  
 60'60"-65'65" - 58 " - "  
 65'65"-70'70" - 100 " - "  
 70'70"-75'75" - 60 " - "  
 75'75"-80'80" - 67 " - "  
 80'80"-85'85" - 23 " - "  
 85'85"-90'90" - 62 " - "  
 90'90"-95'95" - 60 " - "

At about one foot above 90'90" or 97' above the stream intersection the rock is coarser and contains a different fauna.

<i>H. elongatum</i>	<i>L. bifurcata</i>	<i>L. peruviana</i>
<i>P. bellum</i>	<i>L. peruviana</i>	<i>L. acitilis</i>
<i>P. constricta</i>	<i>L. peruviana</i>	<i>P. can.</i>
<i>M. concentrica</i>	<i>P. dehaagei</i>	<i>I. carinatus</i>
<i>A. princeps</i>	<i>A. spiniferoides</i>	<i>A. granulosa</i>

95'95" - 100'100" - 70 paces - Coarser shale like that at the bottom of the Pleurostoma bed. A hard layer occurs about in the upper 3' of the interval. The calcareous layer with *Vertebropora* was not noted.



100' 105' 110' - 62 pieces - This hinges out to the base of a low table 24 feet high. At the bottom the shale is finer than in the Pleurodictyum bed, it rather resembles the bed and bed probably represents the shale between bed 100" and the Pleurodictyum bed fossils are -

*S. pennatus* *C. scutellus*

105' 110' - 115' 120' - *S. pennatus* *C. scutellus* *C. bellistriata*  
*C. striatus*. Fossils are not abundant.

110' 115' - 115' 120' - same

115' 120' - 120' 125' - same

120' 125' - 125' 130' - same

125' 130' - 130' 135' - 27 pieces

*Strophomena*

*S. carinatus*

*C. bellistriata*

130' 135' - 135' 140' - 28 pieces

*M. concentrica* *C. bellistriata*

*S. carinatus* *C. scutellus*

The shale here is coarse, like that of the Earleville, and breaks into large irregular blocks

135' 140' - 140' 145' - 53 pieces

*S. pennatus*

*C. bellistriata*

*S. carinatus*

*S. granulosa*

*S. undulata*

*M. subulata*

*S. carina*

at the top of this page the shale is softer with a different fauna:

*C. scutellus*

*M. pygmaea*

*Ectypus*

*M. truncata*

*S. lobatus*

*M. lisata*

*S. pennatus*

*M. corbulariformis*

*C. bellistriata*

*S. carina*

*S. subulata*

*M. elongata*

*S. carinata*



140' 140" - 145' 145" - 55 paces - soft sandy shale  
like that at top of 135. *B. crenistria*

145' 145" - 150' 150" - ~~same~~ 75 paces - similar  
shale

*I. cainata*, *S. pennatus*, *P. bellistria*  
*G. spiniferoides*, *L. exilis*, *C. elongata*  
*Pall. cristata*, *G. granulosa*  
Small concretions of abundant

150' 150" - 155' 155" - 38 paces - same shale  
and fauna

155' 155" - 160' 160" - 50 paces - same shale

160' 160" - 165' 165" - 48 " same "

165' 165" - 170' 170" - 70 " " "

with *Ellyria spiniferoides* common

170' 170" - 175' 175" - 50 paces

175' 175" - 180' 180" - 120 paces - This brings  
us to the base of the big folds at the  
bridge.

180' 180" - 185' 185" - same shale

*C. bellistria*, *S. pennatus*, *C. cainata*  
*I. cainata*, *P. rana*, *G. spiniferoides*

*M. concentrica*

185' 185" - 190' 190" - same

190' 190" - 195' 195" - same

195' 195" - 200' 200" - " Shale with little

fauna here

200' 200" - 205' 205" - No fossils found

205' 205" - 215' 215" - At the top of this shale  
is coarser weathered blue and has

*I. cainatus* (large)

*C. scitulus*

*S. pennatus*

*C. coronatus*

This has a strong resemblance to the Big Run

215' 215" - 220' 220" - comes the bridge - the

shale in this interval has large *I. cainatus*

and whole appearance of shale is

that of the Big Run. Other fossils

are apparently rare.



220' 220" - 225' 225" - coarse shale <sup>lighter</sup> under  
 225' 225" - 230' 230" - The top of 230 brings us  
 to the base of the Portland Point. The rock  
 below the divided is a very coarse sandy  
 shale, nearly a sandstone.

The Ludlowville of the Clthaca region  
 proved too uniform lithologically to split  
 up. Cleland's zones could not be successfully  
 demonstrated in the field. The upper 20 or  
 more feet bears a strong resemblance  
 to the Deep Run shale but I could not  
 find where the Bellona ended and the  
 Deep Run began. Apparently a single  
 name, the King Ferry, will serve to  
 designate this rock above the Ledyard  
 shale. The Payne creek section is an  
 ideal type locality for the Ledyard.



1927

August 11.

King Range

Abundant - 5'5" (approx) - covered  
 405'5" - 410'0" - The lower part of the bottom  
 of ship has layers of clay, composed of  
 shells and is about 10" thick.

A. granulosa

The place of the bottom is in fact 1/2 foot  
 high the specimens found are in the  
 rock of the falls.

C. velutina, C. dentata, C. pinnata

I. carinata

410'0" - 425'15" - The falls is 16' high  
 The upper part of the falls have a first part  
 composed of sand and a very white.

M. reticulata

C. bellistriata

A. pinnata

E. corallina

C. pinnata

A. pinnata

P. placidus

P. pinnata

425'25" - 430'35" -

A. pinnata

C. bellistriata

P. pinnata

C. pinnata

P. pinnata

M. carinata

C. bellistriata

M. pinnata

C. submarginata

P. pinnata

S. pinnata

P. pinnata

A. pinnata

P. pinnata

C. pinnata

430'35" - 435'35" -

S. pinnata

C. bellistriata

M. pinnata

L. pinnata

P. pinnata

C. pinnata

I. carinata

P. pinnata

M. pinnata



$$\begin{array}{r}
 500 \text{ } 100 \\
 440 \text{ } 20 \\
 \hline
 60 \text{ } 80
 \end{array}$$



435'35" - 440'40" - same shale  
*C. bilobata* *S. radiata* *L. pinnatus*  
*A. spiniferoides*

440'45" - 445'25" - same  
 This layer is the layer fully over the  
 Portland Point. The thickness of this layer

445'45" - 450'30" - same  
*H. oblongatus* *E. bilobata* *S. radiata*  
*H. bilobata* *C. bilobata* *L. pinnatus*  
 Fossils do not appear in this layer

450'30" - 455'35" - same

455'55" - 460'60" - same

460'60" - 465'65" - same  
*S. pinnatus* *P. triquetra*  
*C. bilobata* *H. bilobata*  
*C. acutulus* *T. carinatus*  
*A. spiniferoides* *P. radiata*  
*H. abacata* *P. constructa*  
*L. pinnatus*

465'65" - 470'70" - same

470'70" - 475'75" - same  
*A. spiniferoides* *A. pinnatus*  
*C. bilobata*

475'75" - 480'80" - 485'85" - 490'90" - 495'95" -  
 500'100" + 1/2' to base of Portland Point. Falls  
 within 67' high to the base of the Dickerson

### Portland Point

This layer consists of the  
 base of a layer of corals, each  
 about 10" thick, followed by alternations of  
 calcareous shale, shaly sand and sandy shale



Sully

4' sand

1' yellow sandstone 26' ~~16~~ 16

0' sandstone

~~49~~

Washburn zone

2-4



10' yellow sandstone

1' sandstone

49

36 1/2' D. undulata

2

early shale 5-6' Clinton zone

3"

2' shale 2' Clinton zone

Portland Point 10'



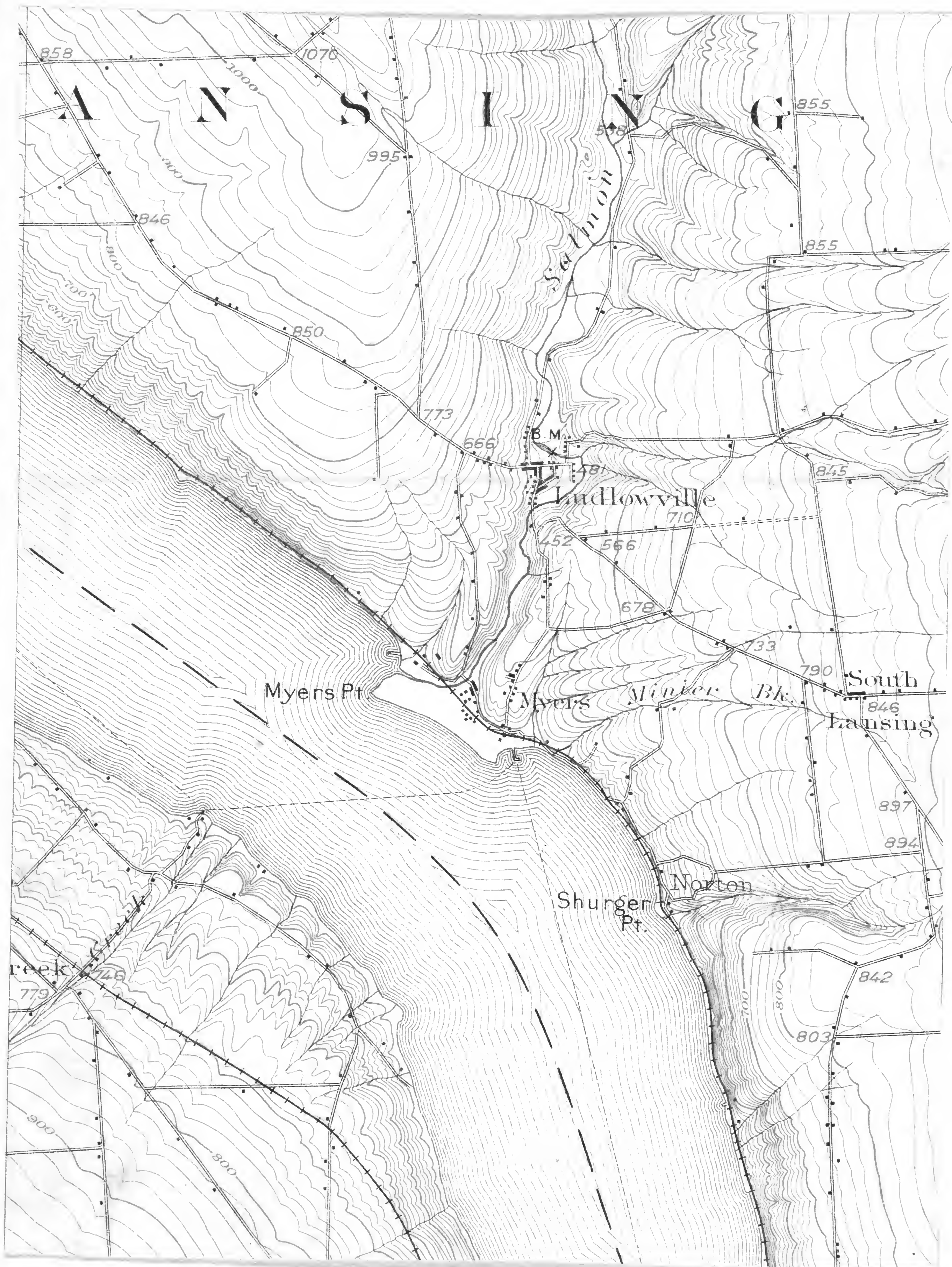




2' of black shale, 2' of it being transitional  
to the lower zone.



176a





At about 28' below the Tully comes the *A. praecumbens* zone in a dark soft shale. The fossils are:-

<i>L. canis</i>	<i>A. praecumbens</i>
<i>H. oblongatus</i>	<i>J. submarginata</i>
<i>C. boethi</i>	<i>P. discoidium</i>
<i>Orthis</i> sp.	<i>L. tulus</i>
<i>C. microneatus</i>	

Aug. 16.

Portland Point

There are about 35' of Ludlowville rocks exposed below the Tichnor here. There are a massive dark shale very much like the soft shales below the Quincy beds at the Lynn quarry. Fossils do not seem to be numerous in there but *C. bellistriata* and *A. spiriferoides* are abundant.

At 115 steps comes the 6" transition ls. and below this comes the *Orthis* zone.

In the *Orthis* zone I found no *Orthis* or other great abundance of *Pelecypods*. There are however a very great many of *J. carinatus*.

The beds above the Encinal I found to be 7' 9" thick.

The first *Ambocoelia* zone occurs at about 200 paces up the ravine, and at 214 paces the *Chonetes lepidus* zone is about 2' above stream level.

At about 250 paces around 2nd bend in stream comes the 2nd *Ambocoelia* zone.



At 368 paces and 4' above valley floor  
*Ambocoelia* + *Pholidops* are still present

at 417 paces is seen the first of the  
*Strophodontia* Coralline zone.

The *Strophodontia*-coralline zone passes  
 into the *M. pygmaea* zone between 450 +  
 463 paces. The *M. pygmaea* zone continues  
 to 890?

873 paces comes the septarian layer  
 near the top of *M. pygmaea* zone.

916 paces is a concretionary layer with the  
 following fossils:-

*L. laurus*

*M. corbuliformis*

*M. pygmaea*

*O. lodinensis* var. *media*

*R. vanuxemi*

*A. praenubona*

*Much pignite*

*M. subulata* c

*C. scitulus*

*S. minutum*

*A. spiniferoides*

(930) paces comes the *A. praenubona* zone  
 and 28' above this is the Tully.  
 and at about 1000 paces the Tully would  
 come. I make the Tully about 2 1/2' 6" in  
 the Glen. It is composed of several very  
 heavy layers of massive, much  
 fractured ls. The bottom layer is 5 or 6'  
 thick. Near the top are bands of somewhat  
 shaly ls. It is terminated by a hard  
 layer 10" thick. On this for 5 or 6' come  
 alternations of black shale and limestone  
 belonging to the Genesee.

The transition zone contains  
 abundance of *L. Canis* and this is  
 found in association with  
*A. spiniferoides*, and *A. reticulatus* to  
 at least 15' below the Tully. Also  
 near this horizon the shales become  
 more calcareous and in the  
*Cystodictya* zone there are several



Bands of ls. The shale for about a foot below the Bully is somewhat darker than that in the *Aptodictya* zone. *S. pennatus* is abundant at the contact.



## Slurgen Glen

## Portland Point.

Aug 15

## Tichenor

Hard, blue grey ls. forming a falls in stream east of the cement works. The Tichenor fossils varies from 8-13" thick

*I. armatus**C. congregata**P. yoa**V. pustulosa?*

On the Tichenor come massive beds of crinoidal ls. with shales. The lowest layer is about 21" thick

*M. concentrica*Large *Orthis* sp.*P. rana**C. bellistriata**S. granulosa**A. spiniferoides*

On the ls. is a shale about 2' and very calcareous. At 96' passes is a layer of ls. 6" thick. This has *R. vanuxemi*, *Tenestellids*. At 118' passes out of calcareous shales are mounted by about 1 1/2' of sh. and this by about 5-6" ls. The 1 1/2' of sh are dark blue grey. At 146' passes this ls goes under the stream and the ls. below the 1 1/2' of shale belong to the Eucrinoid and are 8' thick according to Glendon.

Fauna of 1 1/2' shale - *Orthis* sp. etc.  
The shale is rather soft, breaks easily and is blue grey in color.



10' *Strophodont coralline zone*

*a. reticularis, a. spinosa*

45' *Amphirodina zone*  
mid *Chonetes* *Leptodus zone*  
1st *Amphirodina zone*

10' *Chonetes zone*

$\frac{1}{2}$ ' ls. *Trinacron zone*  
 $\frac{1}{2}$ ' sh - *Orthionota zone*

ls & shale alternations } 8' ?  
Fickens ls.



*D. cuneatus* cc*S. pennatus* c*Pal. constricta* c*G. capellania* r*Goniophora* sp. r*P. radiata* r*B. leda* rc*D. bellulus* r*A. umbonata* rc*Gymn. aia* sp. r*N. corbuliformis* r*C. scitulus* r*N. triquetra* r

6" ls band on the *Orthis* bed is a hard blue-grey impure ls. with *D. cuneatus* c & *S. pennatus* c, also *P. sunta*, *A. spiniferoides*, *Lox. delphinola*.

This layer is succeeded by blue grey shales which are slightly gummy and give effervescence with acid. They contain:

*C. scitulus* cc*Lox. hamiltoniae**C. mucronatus* cc*C. spiniferoides* c*Pal. hamiltoniae**N. pygmaea**Pal. concentrica**Aviculopecten* sp. <sup>about 3' above</sup>*P. radiata* c <sup>6" ls band</sup>*N. corbuliformis**S. pennatus**S. cuneata**Orthis* sp.*C. boothi*

About 3' above 6" band is a somewhat sandy band forming a <sup>low</sup> fall.

This zone passes into the 1<sup>st</sup>. *Ambocoelia* zone which is in a soft dark grey shale. It contains:-

*A. umbonata* cc*Pholidops hamiltoniae* c*B. leda**Pal. emarginata**P. radiata* r*Pal. concentrica**P. rana**C. boothi**S. crotalum*

10' above the *Chonetes* zone the following fossils are seen in a dark shale:-

*A. umbonata**A. spiniferoides* cc*P. rana**Pal. concentrica**Cyt. hamiltonensis**C. mucronatus*



*C. indenta*  
*S. pennatus*  
*Pholidops ham.*  
*R. vanuxemi*

*C. bellistriata*  
*Jaonurus*  
*N. corbuliformis*

This horizon looks like that at Georgetown. I passed, in going upstream from the first Ambocoelia zone thru the *C. lepidus* zone and into the 2nd Ambocoelia zone without recognizing the transitions.

Between 38-43 feet above the *Chonetes* zone is noted a local band of ls. with the following:-

*R. lineolata*  
*M. concentrica*  
*A. reticularis*  
*P. rana*

*A. spinosa*  
*C. coronatus*  
*M. concentrica*

In the shales at 48' feet

*S. rectum* c  
*Cyrtina ham.*  
*R. vanuxemi* c

*S. andaculus*  
*S. subquadrata*  
*Par. hamiltoniae*  
*Pal. concentrica*

at about 50' above the *Chonetes* zone comes dark shale. The shales of the *Strophodonta* coralline zone were lighter than those of the 2nd Ambocoelia zone. I only noted one concretion in the shales of this zone.

zone 7 - *Modiella pygmaea* zone - The shale of this zone is rather dark and is slightly calcareous. It contains:-

*S. submarginata*  
*Pal. tenuistriata*  
*S. andaculus*  
*M. concentrica*  
*A. reticularis*  
*S. rectum*  
*P. stylosa*  
*A. spiriferoides*  
*R. vanuxemi*

*Cyrtolites* sp.  
*R. vanuxemi*  
*C. sitigenus*  
*A. spiriferoides*  
*N. lineata*  
*C. bellistriata*  
*M. pygmaea*  
*Pal. concentrica*  
*N. corbuliformis*



*H. triquetra* *I. carinata*  
The shales 45' above the *Strophodont*  
zone are rather fine & dark.

Fossils are very numerous below the  
Tully ls here and there is seen no  
barren or septanperate zone as the  
fossils of the *Cystodictya* layer run  
right up to the contact. The fauna  
observed in the last 9' of the Moscow  
follows: -

<i>C. incisurata</i> cc	<i>P. rana</i>
<i>S. pennatus</i> ?	<i>A. reticularis</i>
<i>I. carinata</i> cc	<i>R. vanuxemi</i>
<i>S. andaculus</i> c	<i>Trachypora</i>
<i>C. bellistriata</i>	(Favosites hamiltoniae?)
<i>C. boothi</i>	(A huge head with <i>A. rana</i> )
Massive byozoa	<i>Heliophyllum halli</i>
<i>S. spiriferoides</i> m.	<i>Pal. emarginata</i>
	<i>P. stylipora</i>

Fauna of the shales between 9 and 25'  
below the Tully -

<i>S. granulosa</i> c	<i>C. bellistriata</i>
<i>A. reticularis</i> c	<i>S. andaculus</i>
<i>A. spiriferoides</i>	<i>Par. hamiltoniae</i>
<i>Pal. feshda</i> phidp	<i>I. carinata</i>
<i>S. rectum</i>	<i>R. vanuxemi</i>
<i>Pal. tenuistriata</i>	<i>P. rana</i>
	<i>M. concentrica</i>

Between 20 and 25' concretions and  
pyrite are quite abundant. The latter  
is present in masses.

Between 25-30' below the Tully, large  
concretions are rather abundant. At this  
places there is a cascade in the stream.

This includes the *Atrypa* - *Spirifer* and  
Transition zone

A septarian layer occurs about  
54' below the Tully.



## Cazenovia Creek.

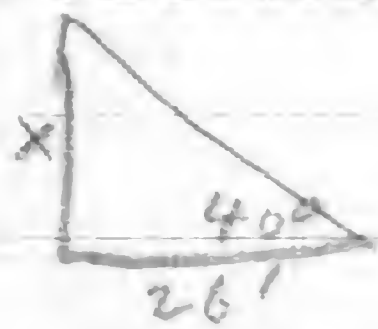
July 19, 1927

100 paces <sup>downstream</sup> below the bridge at East Seneca are dark grey shales that weather by crumbling into small chips. These gave no effervescence with acid. These are exposed for about 100 paces and are 5' vertical. The only fossil noted was a small narrow *Leiorhynchus*.

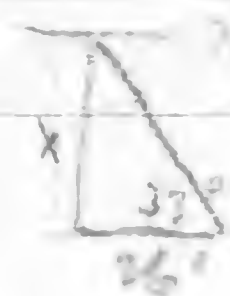
409 paces below E. Seneca bridge shales are exposed in the stream which break into chunky shales  $\frac{1}{2}$ " thick. They are blue grey in color and have a faint grittiness when crunched between the teeth. They have a somewhat concretionary structure. Fossils noted were: - *C. scitulus*, *A. umbonata*, *C. boothi*. These shales give a positive test for  $CO_2$  but the reaction is not very strong.

629 paces in stream bed, blue grey shales, the water etched surface of which shows masses of *S. firmella* with *S. pennatus*, *C. setigems*, *C. boothi*, *C. scitulus*, *Leorhynchus*.

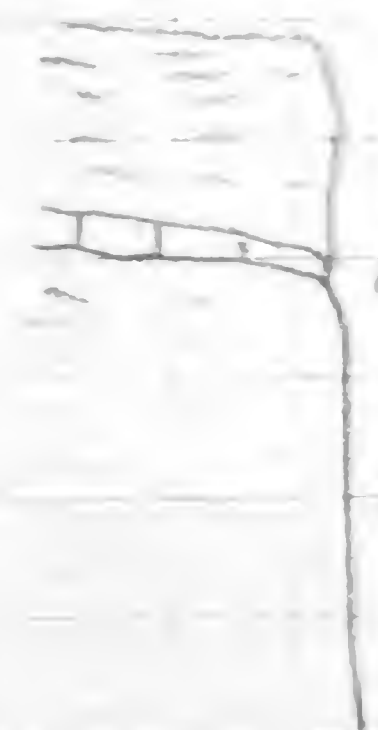
1226 paces is a sheer face of blue grey crumbly shales about 35' high. At about



20' up there is a hard ledge that stands in relief. It is



probably of ls. There are many concretions scattered over the face of the cliff.



Fossils noted about 10' up were *Leiorhynchus*, *umbonata*, *C. lepidus*, *C. scitulus*, *P. fragilis*.

at 1330 paces a line or stratum of concretions may be seen at 6' above stream level.



100

100

100

100

100

100

100

100

100

100

100

100

100

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100

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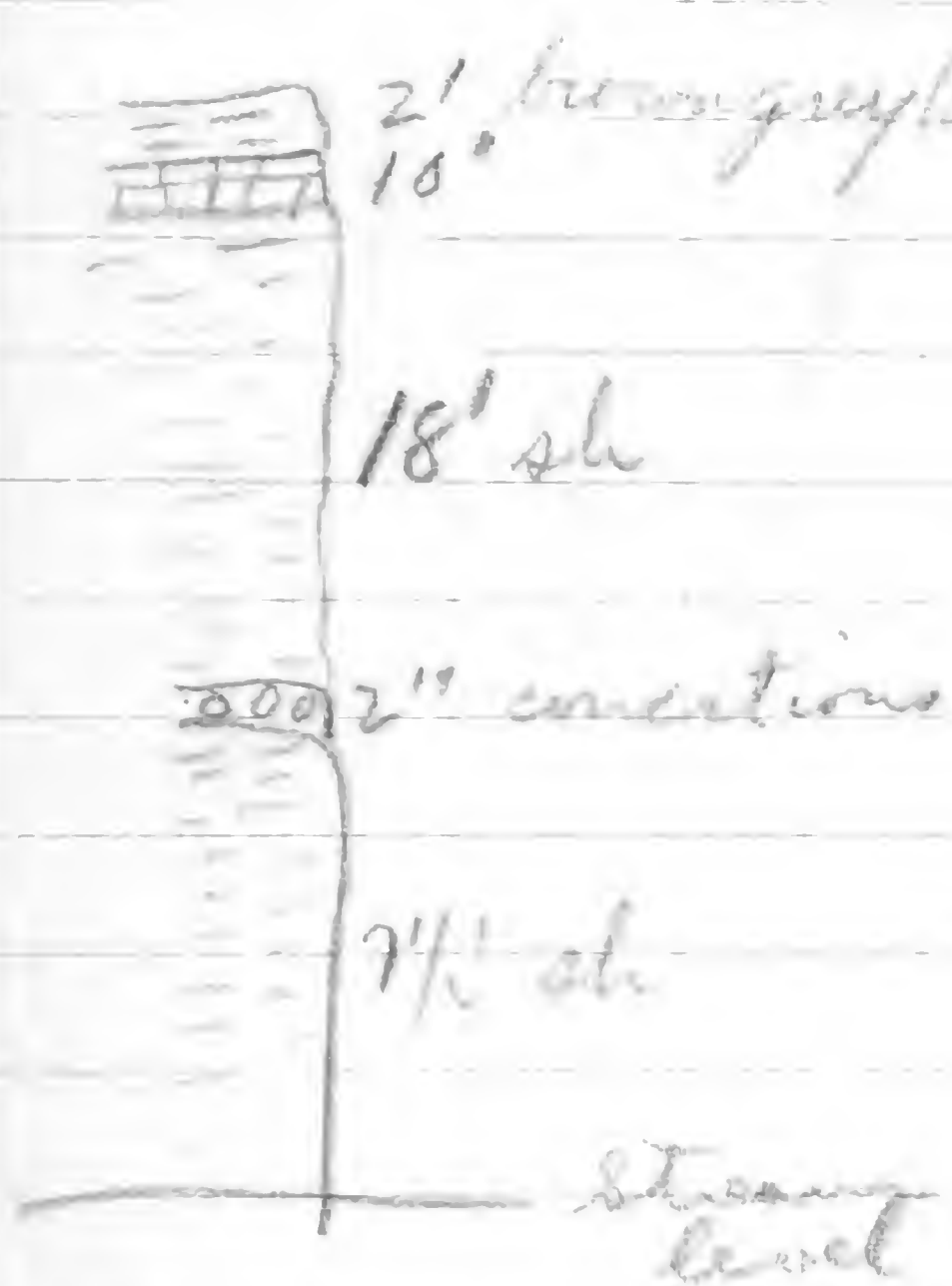


There can be seen as far as the eye can see in the cliff downstream fully  $\frac{1}{4}$  mile.

At 1542 paces a small brook comes in over the upper ls and this permits an examination of the lowest shales which crumble into small fragments. *L. laura*, *A. umbonata* and *C. setigenus* are present. At 7 $\frac{1}{2}$ ' vertically the stratum of concretions is met. They are bedded in a shaley band crowded with fossils such as *C. scitulus*, *A. umbonata*, *Leiorhynchus laura*, *C. setigenus*, *P. punctilifera*. *Ceratopora corals* abundant. The shale next above has *S. fissurella*, 3 $\frac{1}{2}$ '

above this the shale is crowded with *S. fissurella* & has good specimens of *S. pinnatus*.

About 25' above the stream level is the hard band which proved to be a ls of 2 layers the bottom one was of 7" hard but breaks into flattish slabs when struck. It does not contain many fossils. In it we noted *N. triquetra* & *B. ledi*.



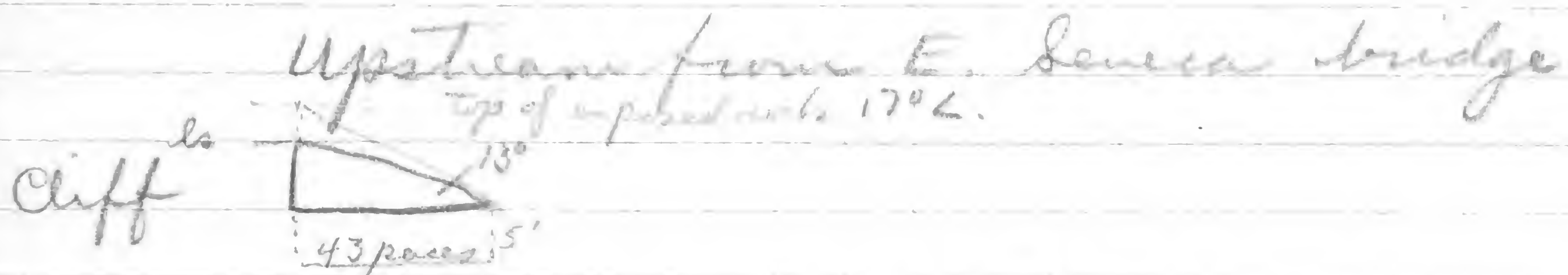
The three inch layer was more fossiliferous containing *C. setigenus*, *Proderostella*, *N. triquetra*, *N. oblongatus*, *P. punctilifera*, *L. laura*?, *Orthoceras* sp. This sh is succeeded by a brownish grey stone which is much softer than that below. Fossils in it are rare, *Ostracodes*, *S. fissurella*, *Chonetes* (small) etc. The stream bed it has a concretionary structure.



Exposures on south bank

2675 paces downstream purplish grey shales are found in a cliff 20' high but there is no sign of the Centerfield ls. This will be waited on the way to Blossom Wednesday, Jan the ls a bit <sup>173 paces</sup> further downstream from 1542 paces another gully shows the section were found many specimens of *Phanerotermis latus*.

According to Luther's map I should have met the the Centerfield ls after having travelled about a mile. However no sign of it was seen just grey shales were met continuously



A cliff at the bridge is exposed on the north side of the creek about 30' vertical to ls banded standing in relief. Stone in the brook here is rounded and pitted by solution but where exposed to the weather it crumbles. This may be the ls with *Strophomena*? as it had not yet been noted to cross the stream.

The shale in the cliff near the stream is blue-grey on surfaces but very dark grey in cross-section. It is only slightly calcareous. *S. firmula* was not ed in the rock.

A block of ls in the talus on the stream bank had a *Eumorpholites*-like Gastropod which may be *P. latus*. At any rate the stone is of the same kind as that found below the bridge



The dip must be very small here because the ls should have crossed the stream. The stone is 29' above stream level here by hand level. The stream must be cutting || to the strike of the beds. It is an east-west stream. The rock below is like that below the bridge. The ls here is only 6 or 7" thick.

Where the road turns south to cross the bridge the ls ledge is well displayed and *S. rudis* is common there.

There are 2 kinds of concretions & also a combination of both. There is a small nodular to tubercular kind of pyrite showing octahedra of pyrite on the surface. The other is a large rounded calcareous concretion of hard ls. This kind contains well preserved specimens of *Ambocoelia*, *Leorhynchus* & *Cratopora*. A third kind is a calcareous concretion containing pyrite.



# Ludlowville section Cozenovia Cr.

Tichenor ls.

30 1/2' ?

6" m. subulata bed?

shale 6' ?

- 3' 3"

shale ls. 6" with Pioneris

3' sh

- 4" discontinuous tabular beds

5' shale with A. spanguloides, P. stylopoda

7"

6" ls.

30' 4" shale

10" ls with Stenoporella rudis

18' sh with L. laeva, Ambocoelia etc.

2" concretions + sh with Ceratopora, Leiorhynchus

7 1/2' sh with L. laeva, S. fusanella, Ambocoelia etc.

- Green ls.

There are probably 10'-15' more shales below when the Elmer section is studied.



## Ludlowville Section

At point b on the map there is a small island just where road crosses the stream. A bridge is marked on the map but there is none here.



At this island and forming a ledge in the stream is the ls. band with *Strophomena*. On the south fork of the stream around the island there is a 60' cliff of Ludlowville which can be measured at least part way up.

The *Phanerotinus* band here is 8" thick composed of 2 layers, the lower one of which is 6" the upper one 2". The lower contains *Phanerotinus* & *S. subulatum*.

On top of this band comes 30' 4" of dark grey shales which are somewhat calcareous. On these is an 8" ledge of ls. that forms a cascade in the stream above, then 20-30' more shale, with 2 ls. bands about 10' apart?

Where the stream forks to go around the island the *Phanerotinus* bed forms a large bare shelf of ls.

Just on top of the *Phanerotinus* bed small *Chonetes* are common, about 15' up (500 paces from stream fork) the following were found: -

<i>P. rana</i> cc	<i>P. imitatoris punctifera</i>
<i>S. pennatus</i> cc	Other <i>O. strobila</i>
<i>C. boothi</i> c	<i>A. spiriferoides</i>
<i>C. setigerus</i>	

At 863 paces the 6" band of ls. is only 6" above the creek level. It contains an abundance of small *Ambocoelias*, *S. pennatus*, many *Orthoceras*, and 2 *Phanerotomaria*. *Strophomena* bed?



At about 875 paces a small gully shows three feet of shale above this 6" of ls. a dark grey shale weathering to a light blue grey. In this *A. spiniferoides* makes its appearance, together with bryozoa, large *S. pennatus* 5 1/2" above the 6-7" ls bed comes another 4" thick crowded with fossils mostly bryozoa, in this were found *P. rana*, *Schizophora* sp., *Productella*, *S. perplana*, *C. mucronatus*, *Schuchertella* *perplana*, *Trematulids*, small *Atthyris* (cora?). The "beach" at 900 paces contained many *P. stylopora*, possibly from the bed between the 7" & 4" ls. In the 4" ls. also *R. fimbriata*, *Aviculopecten* sp., *A. decussata*. This ls is discontinuous and thickens & thins rapidly.

Fauna of shale bed between 8" ls & 4" discontinuous bed: -

<i>P. stylopora</i> cc in place	} The 2 together
<i>Streptelasma</i> c	
<i>A. spiniferoides</i> cc	<i>A. umbonata</i> c
<i>P. rana</i>	<i>P. flabellum</i> v
<i>S. pennatus</i> c	<i>C. boethii</i> , <i>T. carinata</i>
	<i>S. granulosa</i> v

The *Pleurodictyums* are upside down or oblique or with the cups vertical. The *Pleurodictyum* range thru 2 or 3 feet of shale just below the discontinuous band of ls.

The next bed is 3' of soft crumbly shale with many fossils

<i>A. spiniferoides</i>	<i>A. umbonata</i>
<i>R. penelope</i>	Many bryozoa
<i>S. perplana</i>	<i>Streptelasma</i>
<i>S. pennatus</i>	<i>S. concava</i>



*A. bulbosus*  
*S. angulatus*  
*C. boothi*  
*P. rana*

*A. decussata*  
*S. granulatus*

Then follows 6" shaly ls with  
*P. iowensis* c ✓  
*P. rana* cc  
 Corals ✓  
*S. concava* ✓

*Ambocoelia* ✓  
*Sphenotus* ✓  
*C. boothi*  
*R. vanuxemi* ✓

Then 1' shale with *A. spiniferoides*,  
*Sphenotus* cc, *P. rana*, *Paleoneilo tenuistria*,  
*A. umbonata*

Then 2" shaly ls with *S. pennatus* +  
*P. rana*. followed by shale

This is the same as the section on  
 Avery's Creek below the second dam.  
 The hard band below the bed  
 of *Plenrodictyon* must be  
 equivalent to the *Strophalosia* bed or  
 near to it.

On the shales following are *S.*  
*fissurella*, *S. pennatus*, *P. rana*. At 1213  
 paces the shales are very argillaceous  
 and faintly gritty. They contain  
*P. punctilifer*, *S. pennatus* with  
 long wings + ribbent, *Pholidops*,  
 and *Chonetes setigerus*. This is the  
 same as was noted below the  
 Tichenor at the Lake Shore. *P. rana*  
*M. subalata*, This must be Grubb's  
*M. subalata* horizon. The *Modiomorpha*  
*subalata* horizon is below the  
 argillaceous shales with *Ostracods*



As a brittle shaley ls. about 6" thick. It is about 5 or 6' above the 2" ls band. The fauna of this band is *M. subulata*, *P. concentrica*, *P. rana*, *S. pennatus*. At 1245 paces it crosses the Creek.

The shales on the *M. subulata* bed have beautifully preserved *S. pennatus* and *P. rana*. At 1950 paces the Tichenor is in sight about 20' above stream level. The fauna here is predominantly one of *S. pennatus* & *H. spiniferoides*, the former the more abundant. A *Levithynchus* was found. At this point the hand level was used up to the Tichenor and gave 24 1/2' to the bottom of the stone. B. bed was found a foot and a half below the Tichenor.



Fauna of shales in 8' below  
Tichenor

<i>S. demissa</i>	<i>L. delia</i>
<i>A. spiniferoides</i>	<i>R. fimbriata</i>
<i>S. pennatus</i>	<i>A. large spinifer</i>
<i>P. flabellum</i>	<i>S. perplanus</i>
<i>A. reticularis</i>	<i>C. setigerus</i>
<i>S. peruviana</i>	<i>Stictopora byzoga?</i>
<i>A. princeps</i>	<i>Chaetetes</i>
<i>C. boothi</i>	<i>R. vanuxemi</i>
	<i>S. granulatus</i>

The shale below the Tichenor when  
fresh is quite dark and is not calcareous.

*C. scitulus*

*O. cunicatus (transversus)*

30 6

6 6

2

1 6

3 4

5 6

---

45 34

2  
47 6



30

6

1

3

5

6

2

6

4

6

45

24

4071



July 20, 1926

Note from Placentias bed to  
Springbrook bridge was 3500 paces

West of bridge just north of Chazy are exposed shales for about 200 or 300 yards <sup>+ 60'</sup> They are essentially ~~blue~~ <sup>gray</sup> shales.

Brownish gray in appearance on surface of weathered slopes but a dark green in cross-section. Very green and effervescent with acid. Blue fauna is sparse. Fossils noted:

*P. rana**L. loma**L. arctosticta**C. signata**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida**L. pinnatifida*

East of the Chazy bridge 300 paces upstream the shales are of the same kind in weathering but are a more bluish gray and are slightly calcareous. The section there is about 20' high above the stream level. Some of the things here showed in *Antennaria*.

500 paces east of the Chazy bridge and about half a mile between it and another like one just lower the cliff is about 30' high and is capped by a ledge about 10' thick and is that in *L. pinnatifida*. Some debris from this ledge yielded *P. loma*. Where the *Stenosticta* comes in in this section it cannot be seen. It should have been the *Stenosticta* long ago if it were not for being the type of this *Placentias* and the contact should appear further upstream.

It is just a question of whether the fossils in the *Stenosticta* are the same as those in the *Placentias*.



Fossiliferous here are

*Ostracodes*  
*P. fragilis*  
*Lophospira*

One half mile east of Ebenezer  
 is a second bridge but which the  
 stream has been driven down back  
 leaving an island in the middle  
 of the stream just above the dam.  
 Here the shales are of the same  
 nature as those below but the  
 calcareous band is not exposed.  
 Shale blocks under the bridge  
 afforded some opportunity to  
 examine the flora & weathering  
 of the shale. The shale is made  
 of small flakes in some  
 blocks and in others dipping in the  
 fossils are rare but *Orthoceras*  
*lupis* are abundant as well as *Strophomena*  
*O. lottini*

Notes - The band with *Planorbis*  
 must be the equivalent of the  
 Centfield and must be the  
 dividing line, all however, shall  
 appear further up the road on the  
 map.

One mile in the road N. above  
 the south end of the bridge (at the  
 dam) a harder, blackened stone  
 was found which contained large  
*Orthoceras*. I am thought that  
 this stone is the *Phacelostoma*  
 bed. There is also a thin layer  
 of the contact of the bed I believe  
 is just south of the bed  
 on the road at the south



900 1800  
225  
025 = 68) 342 15

145

145

of the bridge. This will make  
the Skeanatcha here from the  
stream level to the top of the  
Phanerozoic land about 40'

## Springbrook Bridge

Ludlowville 4' thick, sand in  
surface of stream crowded with  
*A. spinifrons*, *S. pinnatus*, and  
*A. reticularis* in less abundance. *S.*  
*diversa* also occurs in this horizon.  
In the brook the whole channel  
along the joints just like a *S.*  
3' 1' below T a thin stream bed is with my eyes  
Tichenor

Very thick of several beds. The lowest  
bed is from 2' - 2 1/2 inches thick and  
has a lot of sand on Ludlowville  
surface. It is a sandstone and consists of  
pebbles, but also has corals and  
Glaucite beads. The next layer comes  
from 4-3' in thickness and is a gray  
crinoidal stone. The third layer is  
sand and is fourth. It is upon the  
sand layer about 1' thick and contains  
crinoidal shells. It also splits up into  
irregular rounded masses. This  
probably belongs to the Tichenor. The  
typical Tichenor here appears to be  
about 2' 10" thick, 3' 10" thick if  
the shaly stuff above is added.  
An *Orthis* was 1 1/2' long was found in  
the Tichenor. Also a large *Cryptonella*.



# Maryland section

21' blocky shale <sup>with Staptelasma</sup> breaking into stocky slabs  
 6' shale - crumbly  
 Shaly limonoid stone 1"  
 Thickness 28" - 34"





## Tichenor Is - Cozenovia Creek

Exposed about 50 yds upstream from the highway bridge. The stone consists of several beds of stone varying in thickness and in lithologic character.

The lowest is a grey ls. containing considerable clay and much pyrite. It is 6-8" in thickness. It contains many bryozoa and also Favosite heads, one about 1 1/2' across. It contains also fragments of Crinoid stems, + cup corals. A favosite head in this lower bed measured 2 1/2 x 3' across the top.

On this are 5" grey ls. with a greenish cast having much the appearance of the *Orondaga*. Then 4" of very hard grey crinoidal ls. with pyrite. These beds are very variable, and when one thickens, or thins the other does likewise, the last + upper bed is of a lighter grey, is 11" thick and is marked all over by large Crinoid stems which are at times about 1 1/2" in diameter. The upper bed also contains large heads of Favosites. The total thickness is about 28"

11 1/2"  
18"



## Species observed in the Dickerson

Pirana

D. sculptilis ✓

D. carinatus ✓

D. lineatum

A. decussata

A. spiriferoides ✓

P. icowensis ✓

P. hamiltoniae sub-

Craspedophyllum caespitosum ✓

S. granulatus ✓

R. fimbriata ✓

S. concava ✓

Platyceras

R. penelope

D. exigua ✓

P. oviformis

Camarotoechia sp.

Aviculopecten sp - possible exacutus <sup>slat</sup>

Trochypora limbata



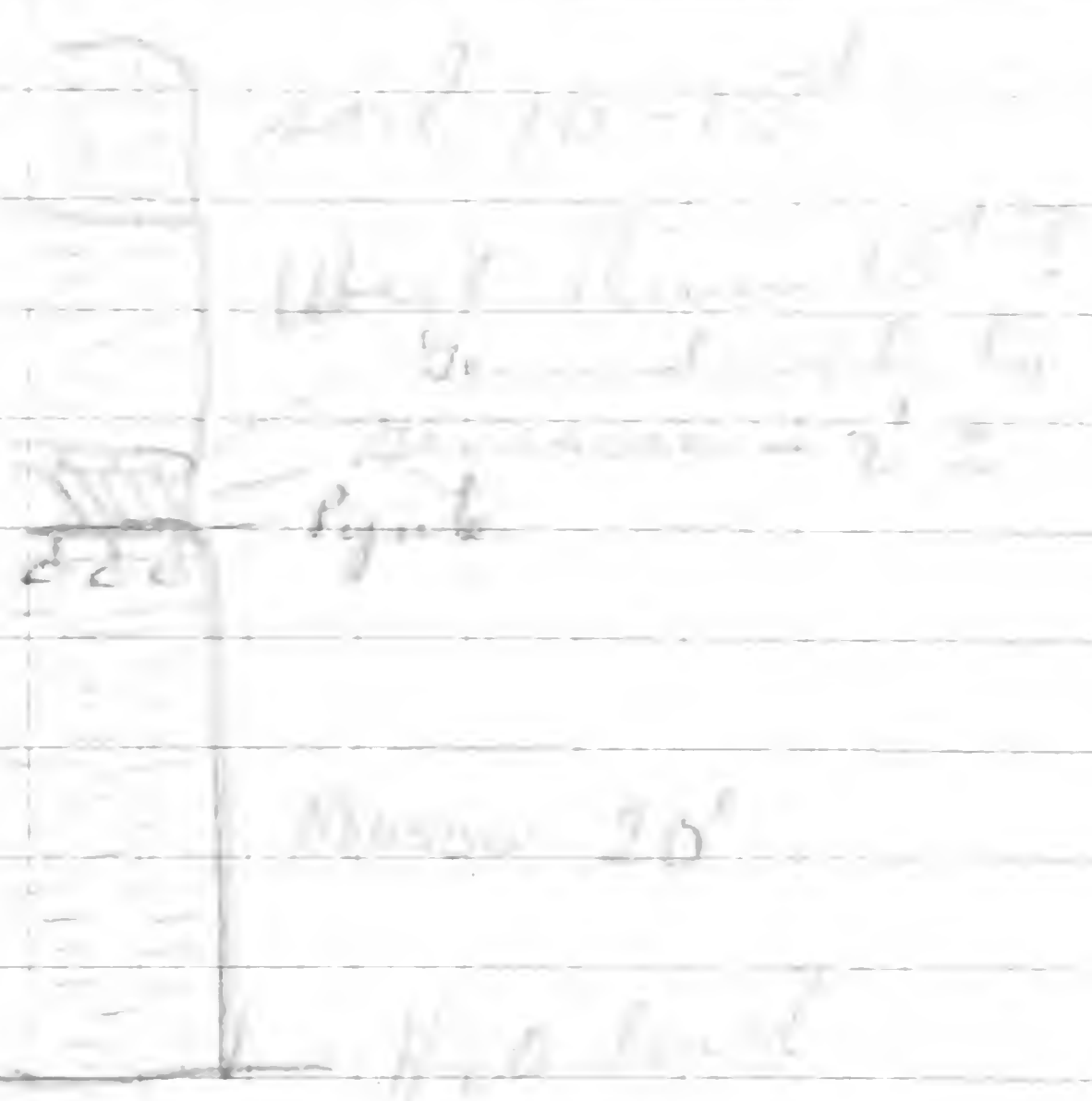




Above the 25" band the shales are still shabby, of a dingy grey with a faint brown tinge. The weathered surface is a dark grey in color - within a few feet have been raised.

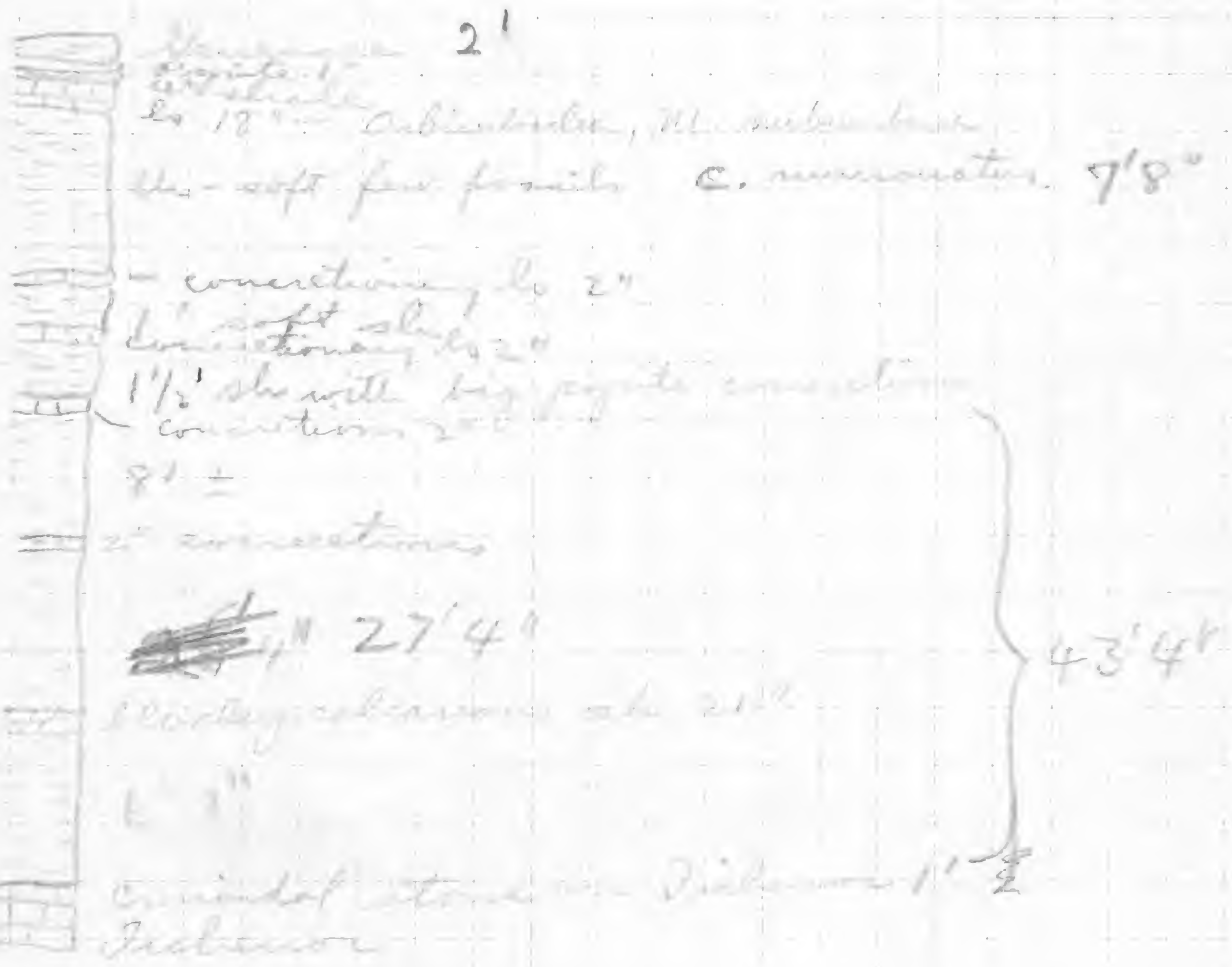
At 147 paces from the end of the island the lead band reaches the stream. Here it has the same appearance as the lower lead band did at 18 mi. E. The only other fossils found were *P. antiquus* by E. Smith, *P. parvus*, *P. stylus* - about 10 below the band.

Crude section sketched at D





# Moscow Section

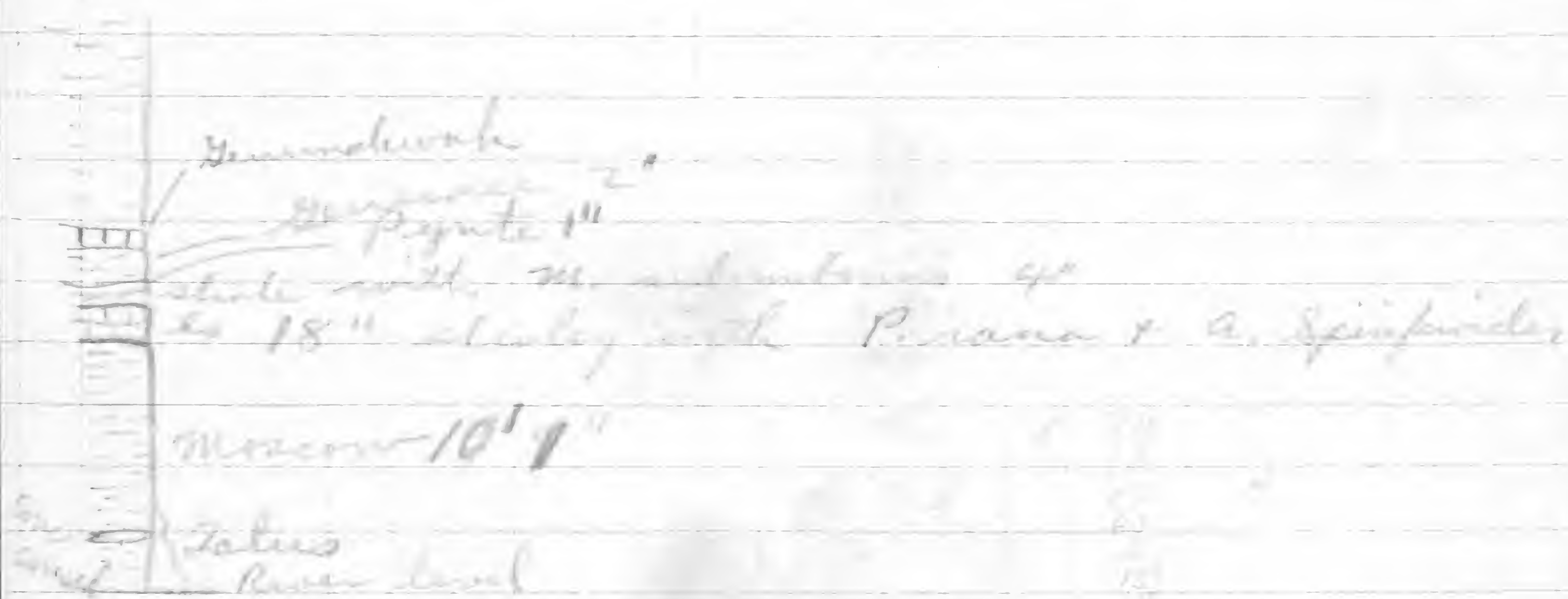


Total thickness 56' 7"

1	4	1	4
7	6	1	6
1	2	1	2
1	2	7	8
1	6	1	6
8	4		4
27	8	54	32
1	2	2	7"
1	2	56' 8"	
6	2	56' 14"	
1	2		
	4		
	9		
	1		
55	47 = 3 11"		
3 11"	46		
58 11"	53		
	3 11"		
	56 11"		



## Section at E



Soft shale of 7'8" has few fossils in it. The shale breaks <sup>so</sup> readily. Only *C. minoratus* and *C. boothi* were noted. A doubtful *Leiorhynchus* was seen.

In the 19" band of ls. fossils were not abundant but the list follows:

<i>M. subumbona</i> ?	<i>Orbiculoides</i>
<i>P. rana</i>	<i>D. submarginata</i> ?
<i>C. minoratus</i>	<i>Pholidops</i>
<i>A. spiniferoides</i>	

In the 4" bed was noted

<i>C. boothi</i>	<i>Orbiculoides</i>
<i>M. subumbona</i>	

In the ls. considerable pyrite was seen. The lenses of pyrite were flat and elongate, varying from 1-5".

The bed below the last concretionary bed has practically no fossils, only *Pholidops* here & there and a small *C. spiniferoides*. The color of the rock is dark blue.



gray but when weathered is olive  
in section.

The section as a whole is not  
very fossiliferous. The most fossiliferous  
portion is that with the conical  
fragments.

On the present section the  
zone of *Cystiphyllum* was not  
located. But it must be present  
as a *Cystiphyllum vesiculosum* was  
located in the same bed.

Little says that the present shales  
are everywhere "exceedingly abundant"  
but this does not seem to be true on  
Cannonville Creek.

About 200 yds from the bridge the  
bed is just under the lignite  
is a layer of huge chert nodules.



- Parenula radians* a  
large form from Cazenovia  
● incorrectly called *Potens*  
at Colgate
- 

- *Murela sandalli* = *M. opima*  
Hall.
- 

- *D. alveata* Leonardville  
from the Mattville or  
upper Peckaport
- 

*Sphen. archaeiformis* type  
from the Delphi & at  
Pratts & Delphi Falls

---

- *D. erectum* - Laz. type  
pl. 11, fig 8, pl. 86, fig 6  
● is from Delphi - looks  
like *Levopteria* - I suspect  
● we have both *Actino* -  
and *Glyptodesma*.  
pl. 11, fig 7 - at Colgate (?)  
fig 5 -



*P. maculatus*

Typ. - Pl. 8, fig 9 is  
labelled from Hamilton  
N.Y. is from upper Colgate

*P. undosus* - pl. 2, 18  
is Moscow or Kashong



# Brachiopod types at Albany

- *U. coriinna* 8, pl. 48, 24, 26.  
22, 27, 29
- *Meristella hastiniae* 8, 44, 31.  
43, 23, 24, 25
- *P. luisuta* 8, 49, 28-32  
Int. 49, 37, 39  
Spines. - 36
- *V. pustulosa* -  
Camandigua lake 82, 10, 24
- Pent. unaulcata biphcata* 8, 42, 31
- L. perplana* 8, 15, 11.
- A. spiriferoides* 4, 46, 11, 13  
8 45, 17, 13, 12,
- *S. uncinatus* 4, 34, 2, 16,  
8, 24, 22, 2  
8, 34, 13
- *S. asper* - 8, 25, 25



*S. acuminata* 4, 35, 24  
occurs with a specimen  
of *S. divaricata*, on same  
block. & *Camarotoechia*

*S. maruyi* - 8, 22, 13.

*S. fulleri* 4, 37, 13, 16, 15,  
4, 35, 8

*S. andaculus* 4, 38, 21, 2, 4, 5, 6.  
12, 13,  
8, 15, 4, 18  
8, 29, 5

*S. andaculus saxonii* 4, 38, 12, 17

*S. macronotus* 4, 38A, 4-6  
9 4, 38A, 18

*S. fimbriatus* 4, 33, 16 - 19

*C. spinosa* 8, 55, 22  
4, 53A, 13

*C. reticularis* 8, 55, 7

*D. inaequistrata* 4, 18, 21.



*C. praemorsa* 4, 44, 6, 2  
from praemorsa zone.

---

*P. purpurea* 4, 58, 35.  
8, 71, 31

---

*C. congregata* - 4, 54, 57 -  
apparently from Mattville

---

*S. jima* 4, 18, 30  
8, 15, 16

---

*C. coronatus* 8, 16, 11, 24,

*E. imitator* from Delphi

*S. concava* 4, 16, 1d, 1a  
8, 14, 20, 21, 19

---

*Lindstroemia* 8, 42, 25, 26  
*aspidium* 25, 27, 26

---

*O. randalli* 8, 42 - 18

*Orthocentrus* <sup>arcti</sup> *cheimys* 4, 9, 7, 11, 17 <sup>Reunert</sup>



*R. penelope* 8, 6A, 10

*L. punctata* 4, 1, 6f  
8, 1, 26, 28.

*C. crenistria* 8, 4H, 9

*L. delia* 8, 1, 29.

*R. grandis* - Coz - 8, 4E-30

---

Glenarie specimens  
are from Glenarie Is.  
& Oriskany ss.

---

SA.

Mesembria - a dalmatides  
genus.



Oncaster - first true  
ophiurid - does not  
appear to be Oncaster  
at least the one exhibited

• *Eugasterella logani* -  
Fenner, N.Y. appears  
to be *Delphi* in age.

Long whiplike arms  
disk, plated - ossicles suggest  
relationship to *Encrinaster*

my blastoid from Kashong  
is *Pentrematidia whitei*

• N.Y. St. Mus. Ann. Rep.

15, pp. 149, 150; N.Y. St. Mus  
Bull. 69, pl. 1, fig. 1



Early editions of the  
Handbook of Brach.  
give many genera  
to Hall only.



Essex a crustacean,  
according to Ruedemann.

---

### Devonian

Synthetic slab has a  
● large number of starfish  
associated with a *Grammysia*  
called on labels as *G. lamulosa*  
Vernon. The latter looks  
● like *G. elliptica*. It does not  
have the ridge of *G. bisulcata*  
and is an almost smooth  
shell. Other fossils with the  
starfish are *Diguonia*  
*olucata*, a large *Leiopteria*  
~~(or small *Glyptodonta*)~~ and  
● as species of *Comarotoechia*.  
The starfishes run about  
● this long ———. The  
longest on one arm is  
—————. One is im-  
● pressed immediately with  
the uniformity in size



of the specimens

Anchanodon is used  
for the generic name of  
*Amnigenia catskillensis*  
must be looked up.

---

*Cryptonella endora* -

Chemung - Althaca, W.V.

---







July 22

1978

Coyanona Creek

923-1167 - about 100' is a 4-6" concretionary  
 limestone forming a ledge in the creek  
 This stone abundant in a small variety of  
 trilobites. At the contact of the concretionary  
 layer the shale below trilobites are  
 abundant. This layer is not  
 prominent to the top of the bed.

*C. setigerus*  
*S. foliata*

*P. setiger*  
*S. subulatus*

923-1167 - *Planolites* bed

*A. spiniferoides* c  
*S. granulosis*  
*S. hector*  
*P. styliporum* c  
*C. setigerus*  
*C. scutellus*  
*C. umbonata*  
*A. macronota*  
*R. ramnensis*

*P. ramnensis*  
*P. curra*  
*S. planatus* c  
*C. ramnensis*  
*S. foliata*  
*S. granulata*  
*A. macronota*  
*P. ramnensis*  
*R. penelope*

Thinly bedded limestone comes at 1167 paces.  
 fossils

*P. ramnensis* c  
*S. hector* c  
*S. curra* r  
*A. spiniferoides* r  
*R. penelope* r  
*A. subulata* r  
*C. foliata* r  
*S. ramnensis* c  
*P. stenorhynchus* r

*P. curra* a  
*C. hector* r  
*Productella* sp. r  
*M. subulata* r  
*P. setiger* r  
*C. planatus* r  
*C. ramnensis* sp. r  
*R. foliata* r  
*P. curra* r

Thin bed about 4" thick.



1317 fossils in a poorly defined calcareous layer 5" thick. Gleaned from S. pinnatifida & also has P. constricta and P. rana. This is referred to bed 14. At 1317 it is 3' above stream level.

Fossils seen in the shale between bed "su" and the middle dyolite bed are:

S. fissurella a  
S. pinnatifida a  
S. pinnatifida  
M. subulata  
C. scabrus

L. lina  
C. setiger  
A. undulata  
P. rana

There is about 6 1/2' of this shale.

Shale between lower dyolite bed & concretion bed is 9" thick and contains:

S. pinnatifida a  
S. pinnatifida  
P. rana  
L. lina  
R. vancouveri

A. undulata a  
A. undulata a  
C. bothei  
S. scabrus

Concretionary bed - 3"

S. fissurella a  
M. subulata  
S. rana  
C. bothei

S. pinnatifida  
C. setiger  
B. lida

M. pinnatifida a

Mythella trilobata 6'

S. pinnatifida  
P. rana  
S. pinnatifida  
P. pinnatifida  
S. pinnatifida

M. subulata  
C. bothei  
A. undulata  
B. lida



The trilobite beds are very poorly defined  
 and appear to be thin. Near the bottom of the *Phacodictyon* bed  
 is a layer of concretions, and at the  
 contact with the *Stroph.* bed *Amplexus*  
 of small size is very abundant. The  
 lower 8" contains great numbers of  
*Amplexus* & some *Phacodictyon* concretions  
 also abundant in the same fossil.

*Stroph.* bed rises about 4 1/2' in 300' giving  
 a dip of 68' per mile

135

30 / 5100

124

Back of page -

Lower trilobite bed to *Stroph.* bed - 0-225

*Stroph.* bed - *Phacodictyon* - 225 + 915 =  
 1135



## Remarks on Cayamoria Creek

Cayamoria Creek was walked from Shagen at Lewis Park (Evangelical Park) to the Seneca St bridge but did not see the Centennial monument. The measurements of last year on the cliffs near Wahl's Ice House and O.K. Bar Phosphate were based at stream-level and the whole sequence up to top is exposed. The 30 ft. interval between the Phragmites bed & the Strophodontifera fossils. The typical Strophodontifera bed was not seen but a layer of sandstone containing small Strophodontifera was in its place. The shale immediately below the Strophodontifera bed abounds in *Strophodontifera*. Other fossils in the corresponding layers are like those of the typical Strophodontifera bed. Immediately following the sandstone layer the shale for a certain small distance was in great proportion. A similar layer was observed near Seneca creek just above the sandstone layer photographed.

Phragmites is more common in the lower two feet of the layer. *Strophodontifera* is much less abundant. The proportion of *Strophodontifera* was not observed. The white beds are much better defined here but the lower bed is mostly composed of proportion of *Strophodontifera*. That is, in sliding and abundance of *Strophodontifera*. The corresponding Strophodontifera horizon dips about  $4\frac{1}{2}^\circ$  or about  $30^\circ$ , and is 34(?) above stream 9167 passes downstream from the point where it is at stream-level.



July 23

## Cogenova Creek

The upper surface of the Tuckahoe is transitional to the Moscow above for 2 or 3 inches. The fauna is that of the Tuckahoe.

*C. maculata* c  
*C. sparsa* - dense  
 Wood  
*Platystrophia* (small sp.)  
*C. planus*  
*C. subquadrata*  
*D. marginata*

*A. limbata* 2  
*C. maculata* c  
*D. lineata* c  
*G. decussata* c  
*P. parvicauda* c  
*A. subquadrata* c

Pyrite. *D. subquadrata* is abundant. The above becomes shaly. Crinoid stems and bryozoa also abundant.

Between the upper transition beds and the *Strophomena* bed are 7' of shale. The shale for 2' 10" above the Tuckahoe transition contains very few fossils. It is essentially barren shale. Above 2' 10" inches *C. subquadrata* becomes abundant. There is no visible difference in the kinds of shale.

Fauna between 2' 10" up and the base of the *Strophomena* bed:-

*C. subquadrata*, a  
*C. maculata* c  
*C. styligera* c  
*C. planus*  
*P. styligera*

*D. subquadrata*  
*C. maculata*  
*A. subquadrata*  
*D. lineata*



1

1





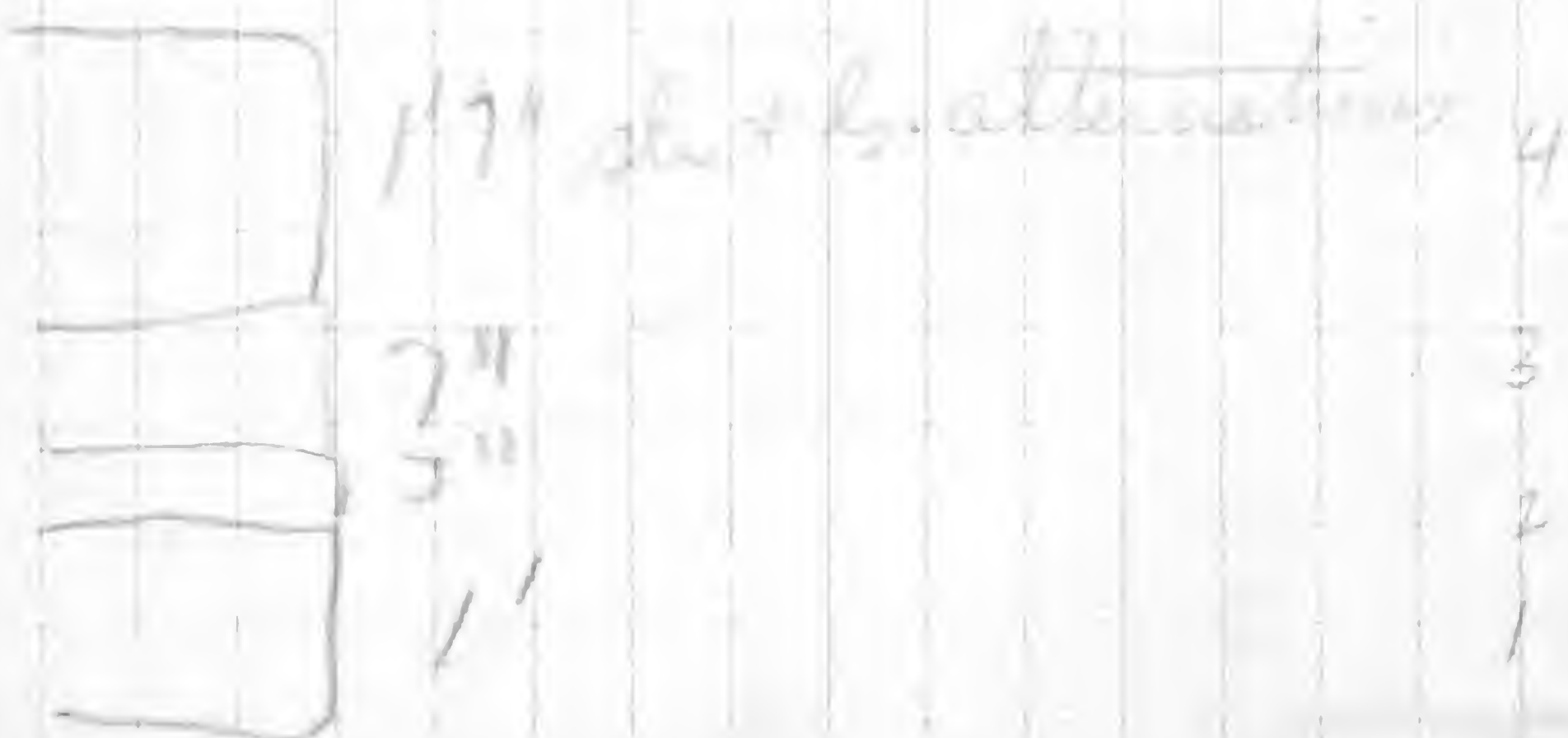
The *Strophomena* bed is an impure  
 brittle, shaly limestone fossils are rare  
*C. boothi* *T. submarginata* *C. mucronata*  
*P. rana* *A. submarginata* *S. section*  
*Strophomena*  
 It is not more than 4-8" thick and is exposed  
 on the stream 345 paces from the bridge

1403 paces upstream the ls. 35' above base is  
 about 12' above stream level.

Fossils in concretionary layer below *Strophomena*  
*A. praecumbens* *A. plate* *O. oblongatus*  
*P. rana* *A. section* *A. sp. ferigides*  
 About 2700 paces from the bridge the concretionary  
 bed is thick and about 12" thick and is fossiliferous.  
 The shale between it and the pyrite is 15" thick and is fossiliferous.

*A. praecumbens*  
*A. andacule*  
 At least 2 feet of rock contains *A. praecumbens*  
 and for about one foot below the  
 concretionary bed the shell rounds in  
*C. mucronata* with a few *A. praecumbens*

*Tidder section*





1. is a heavy massive coralline bed containing corals and large numbers of fossils.

Fossils: *Phyrea*, *P. carinata*, *A. quadrifida*, *P. placata*, *R. variegata*.

This layer it would correlate with the thin one on the lake shore.

Fossils in *S. demissa* bed - Bay City.

*S. demissa* c

*A. quadrifida* c

*S. schucherti* c

*S. recta* c

*S. spinea*

*A. variegata*

The *S. demissa*

*P. flabellum*

*R. variegata*

*A. quadrifida*

*Cyrt. luma*

*P. carinata*

*A. reticularis* c

*A. granulosa*

bed is exposed from the bridge downstream for about 200 yds. Cyrt. frag is excellent. *S. demissa* is abundant.



## Cayumia Creek

Essentially the same sequence as on  
Snakes Creek. *Strophomena* bed has fewer  
fossils and is poorly defined. Collecting  
in the Moscow is not good. *Edinara*  
bed exposed at and downstream from  
Spring Creek bridge. Tichenor is  
thick and is especially marked by the  
upper shaly layers.

Bull's ledge. Tichenor is about 5'  
thick and shows an increase in  
layers at both top and bottom. *Edinara*  
bed here exposed about 6' below Tichenor.  
Moscow section not good. Calcareous beds  
poorly defined. In all between Tichenor  
and *Strophomena* bed partly Tichenor.  
Rushong shale not yet prominent.

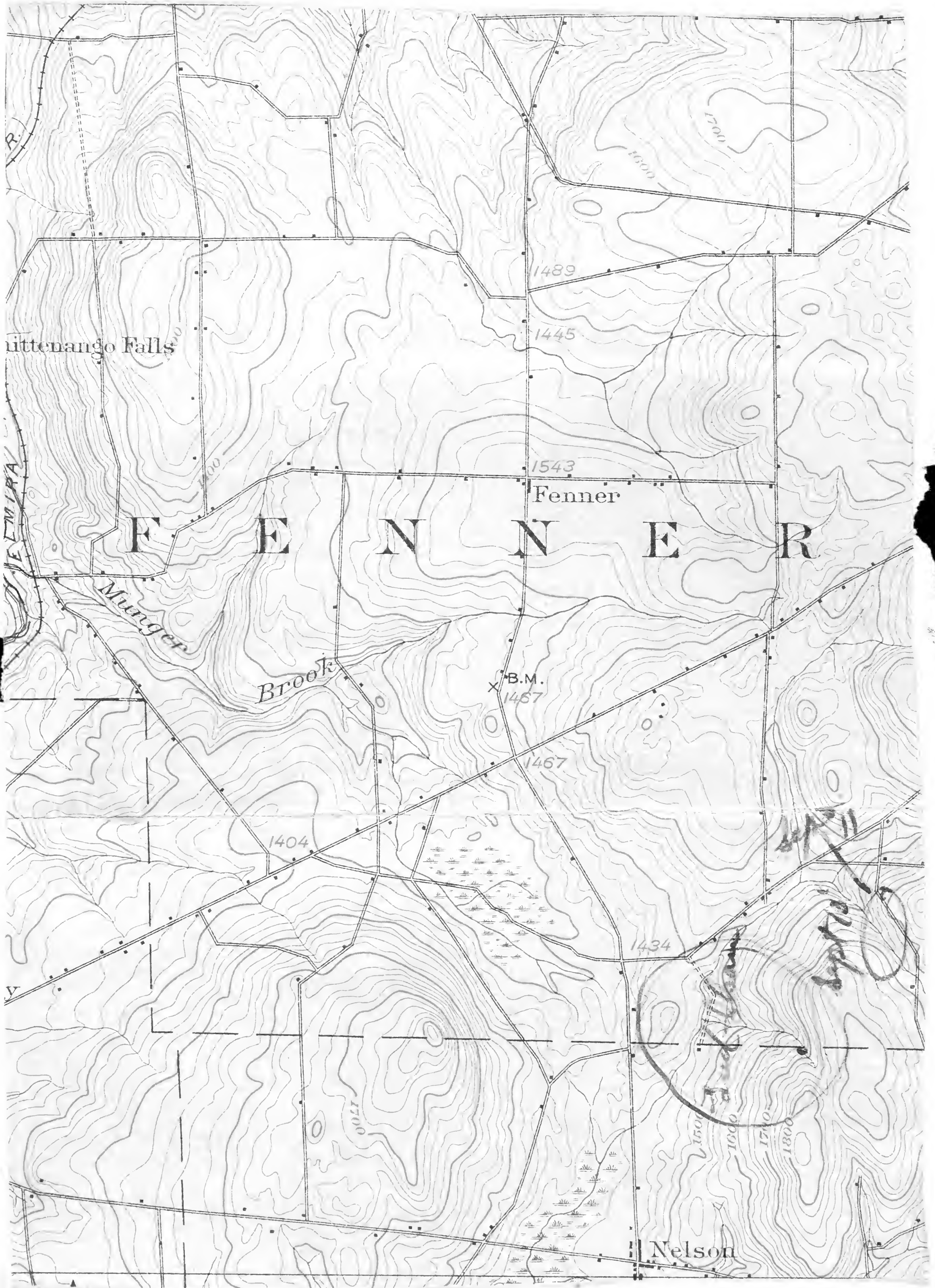






1928

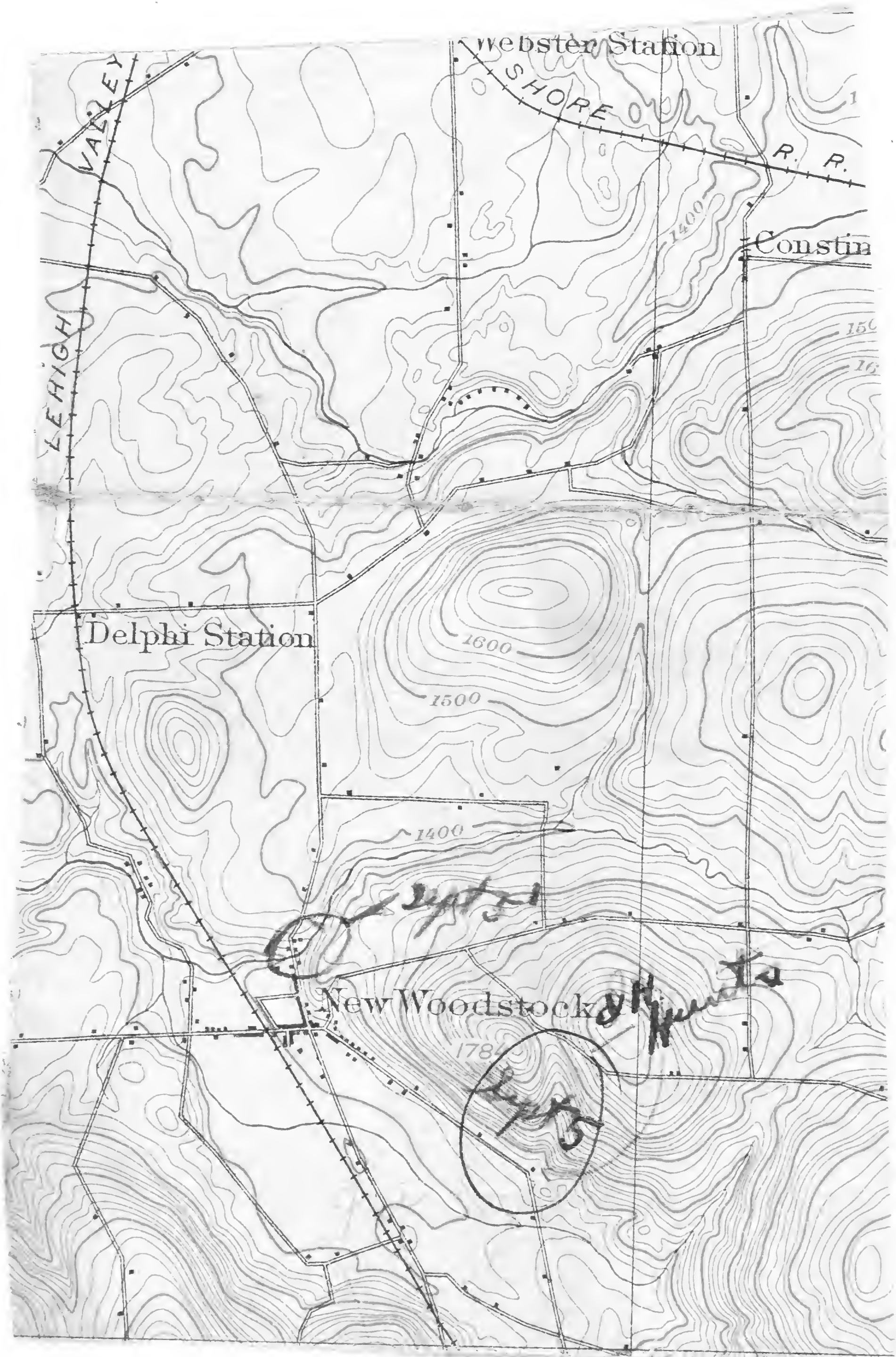
160a





1606

1928



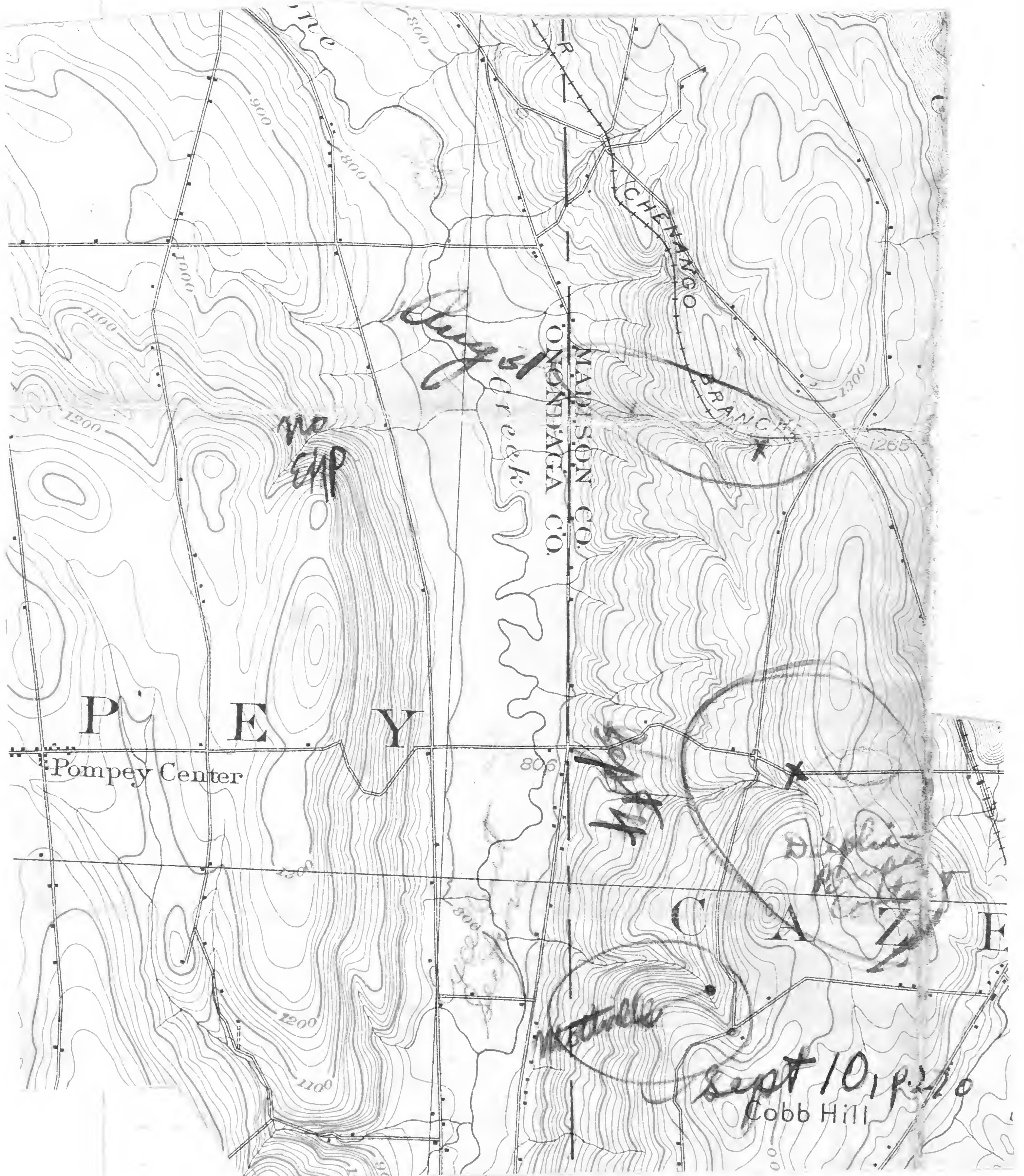






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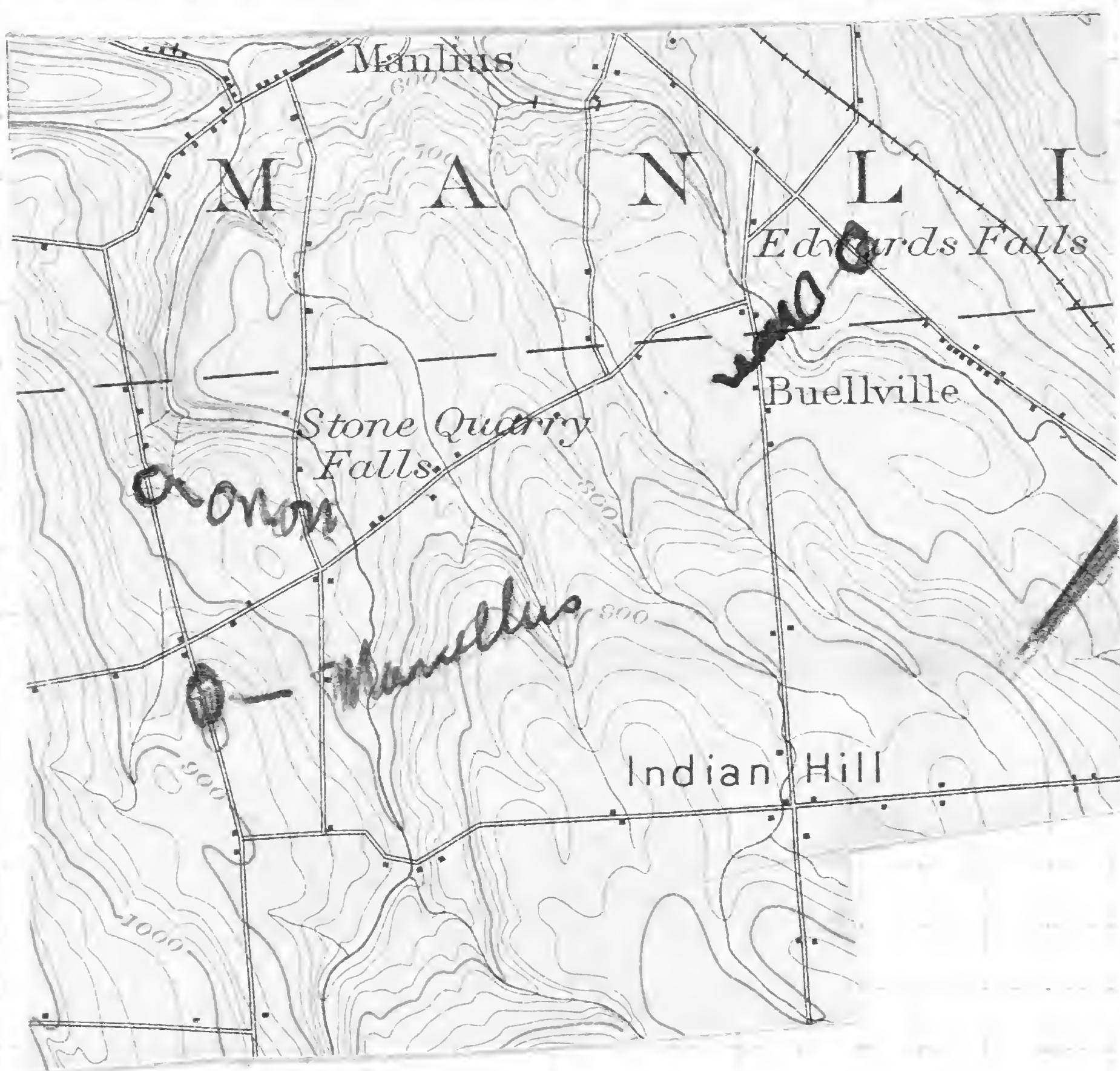
160d





1928

160e

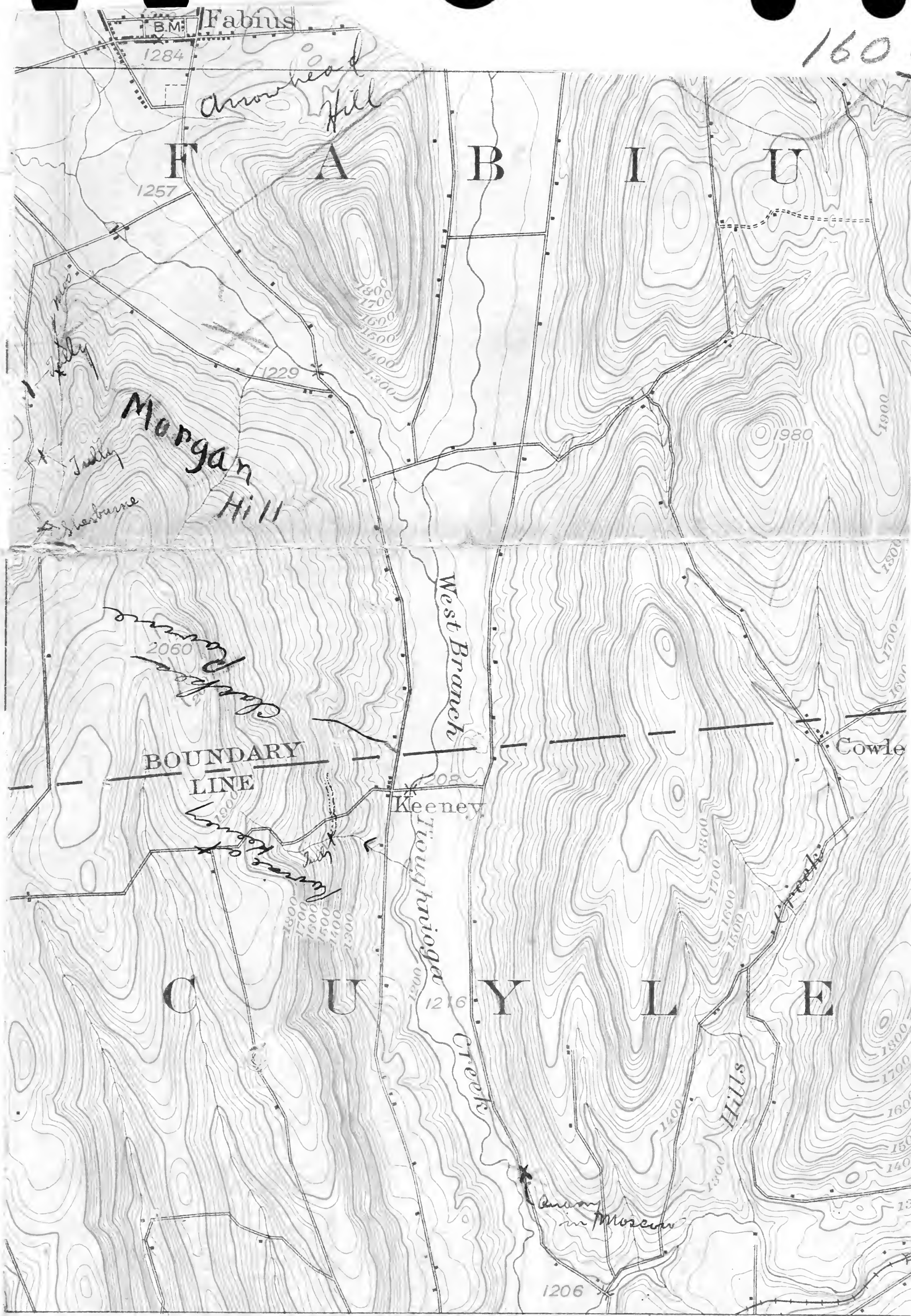








160.9



00'

ENGRAVED, OCT. 1899 BY U.S.G.S.

H.M. Wilson, Geographer in charge.

Control by N.Y. State Survey.

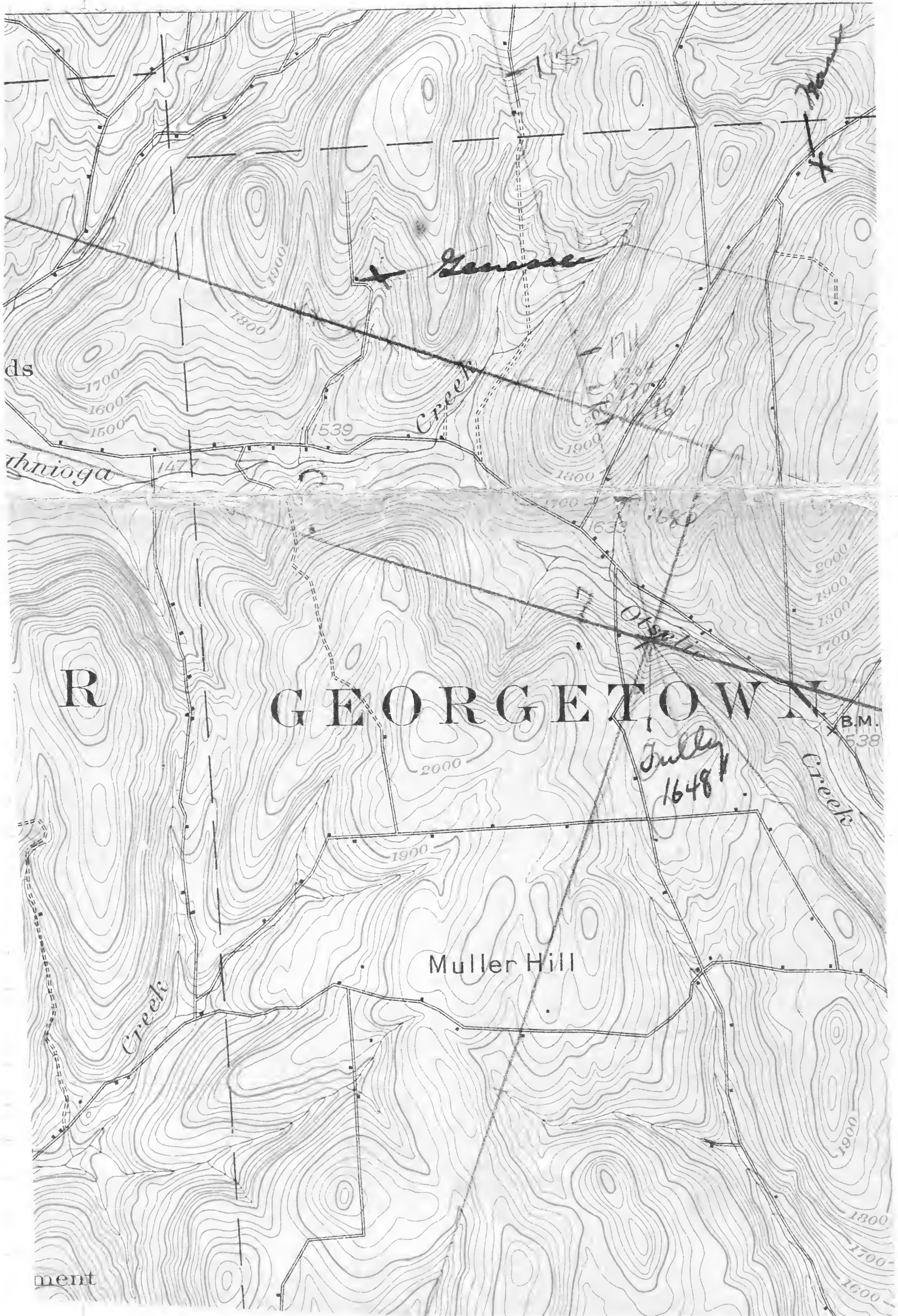
Topography by A.M. Walker.

Surveyed in 1897.

1

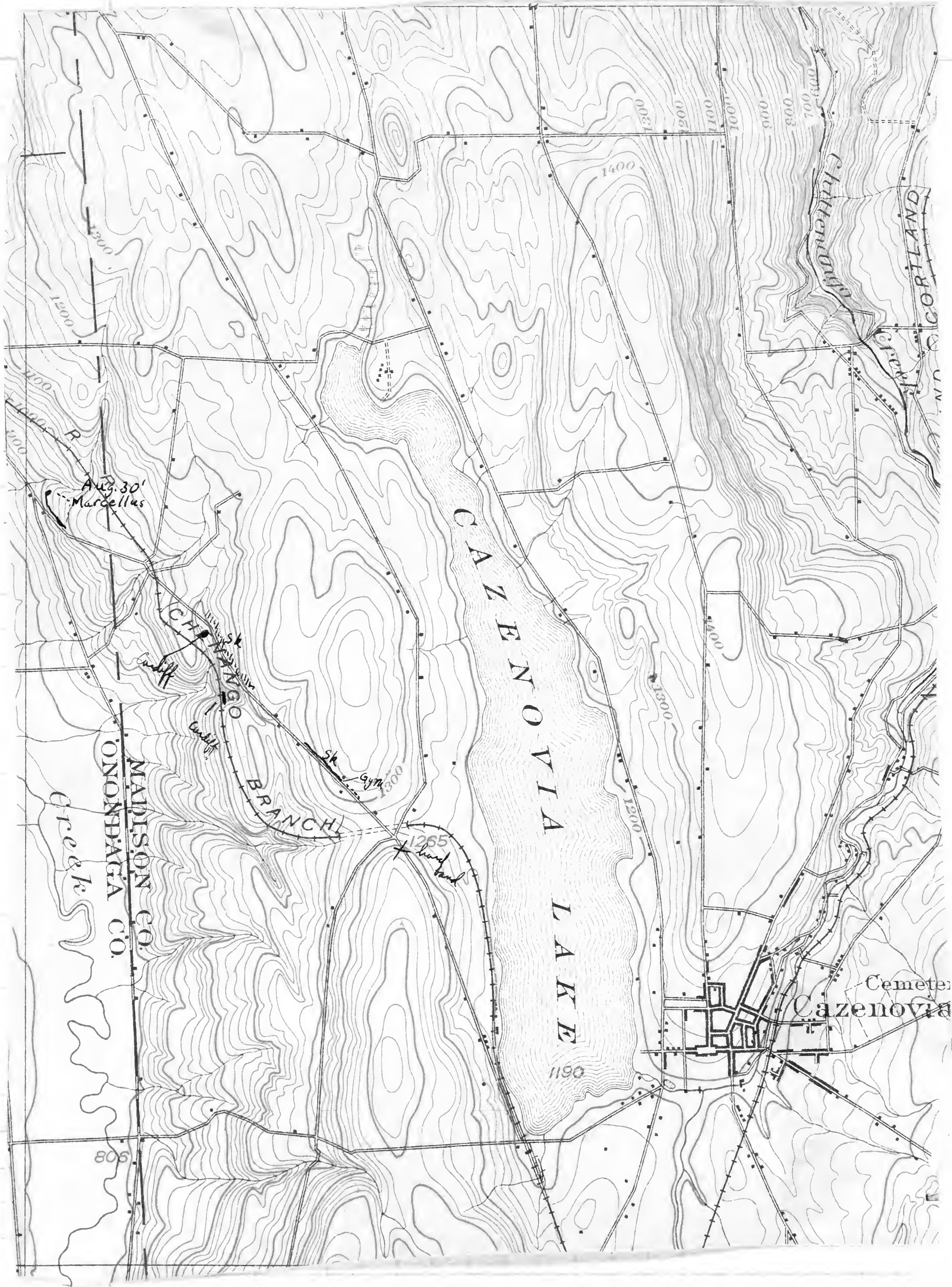


160h



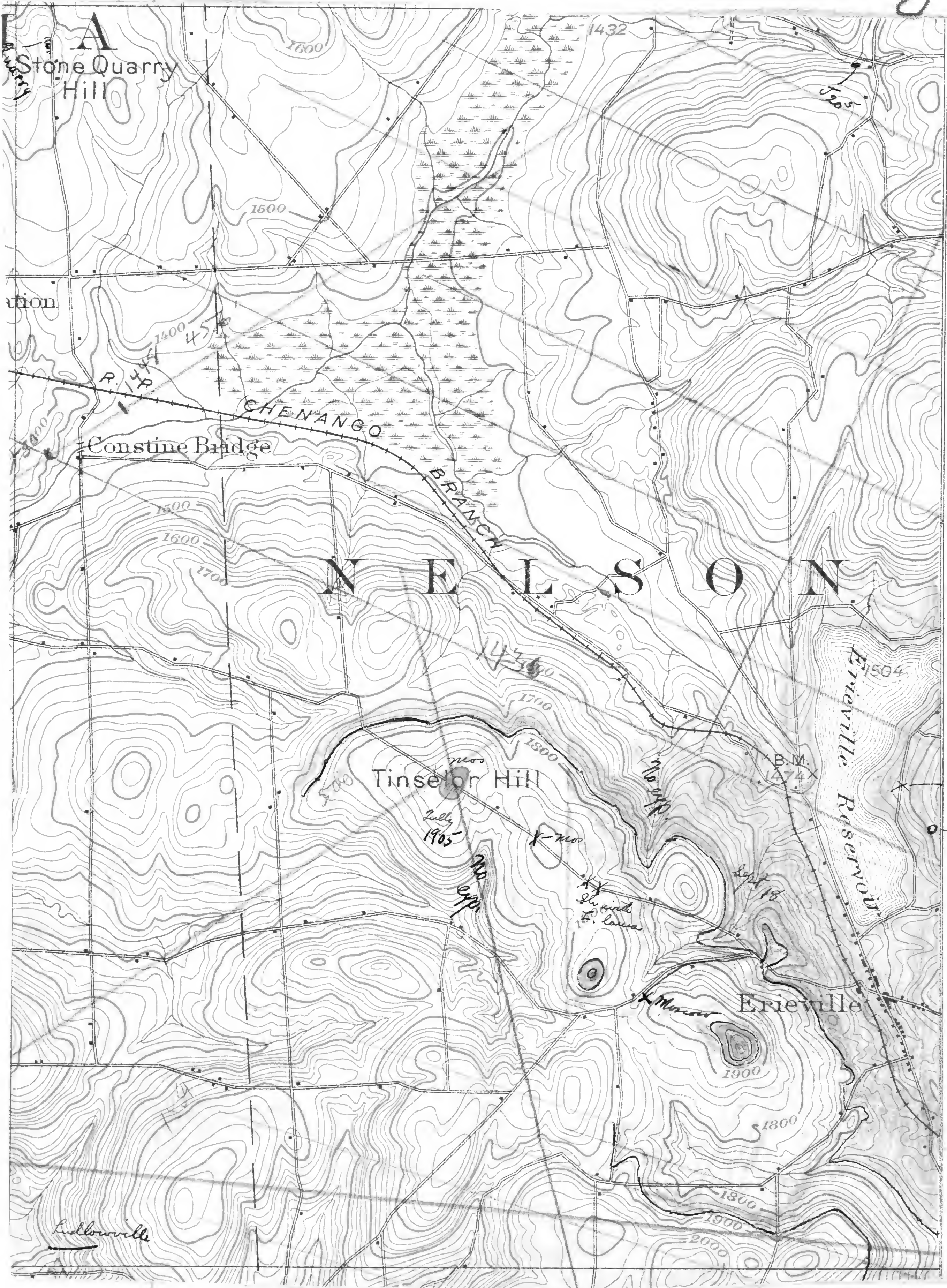


1602



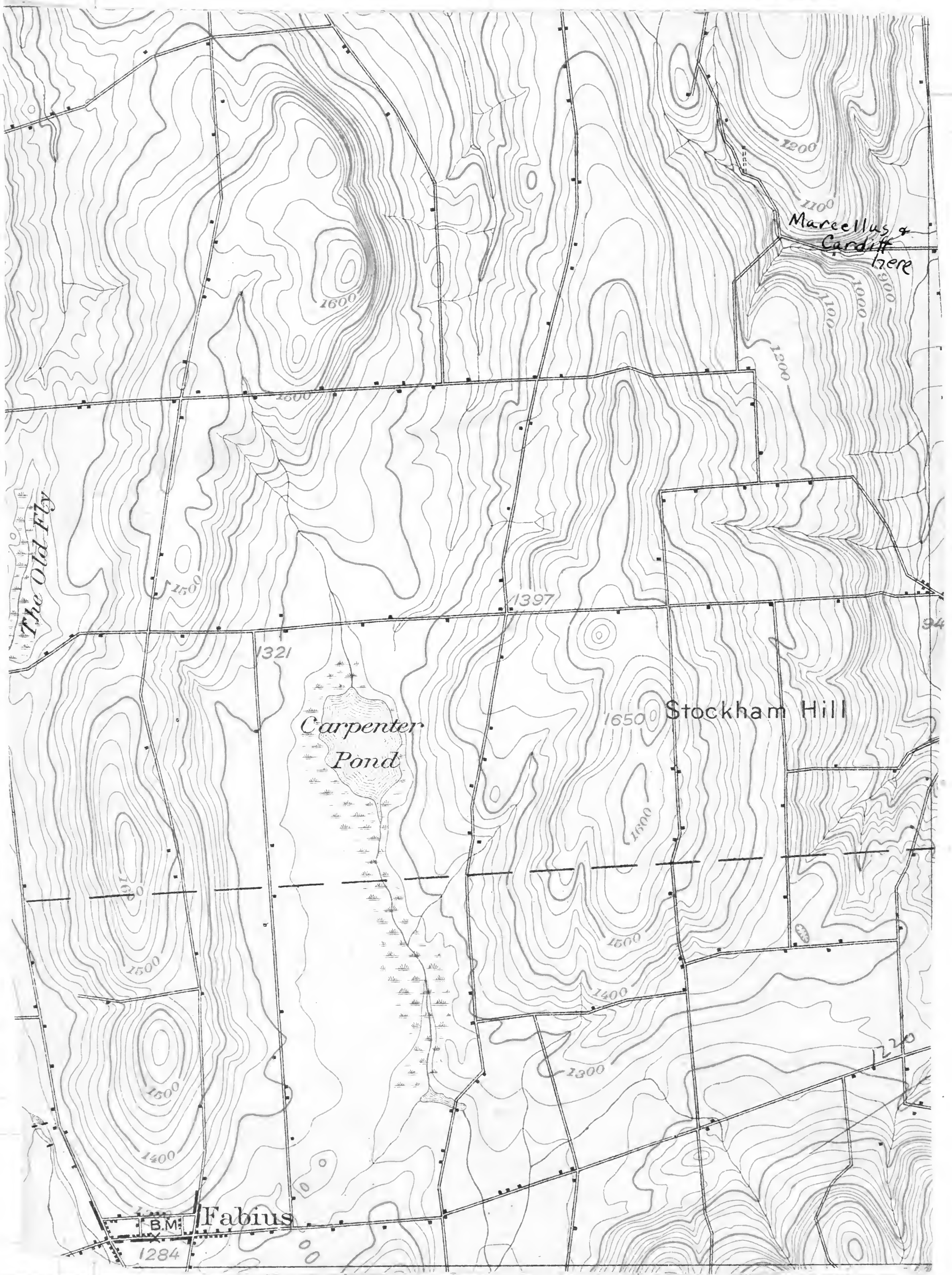


160j



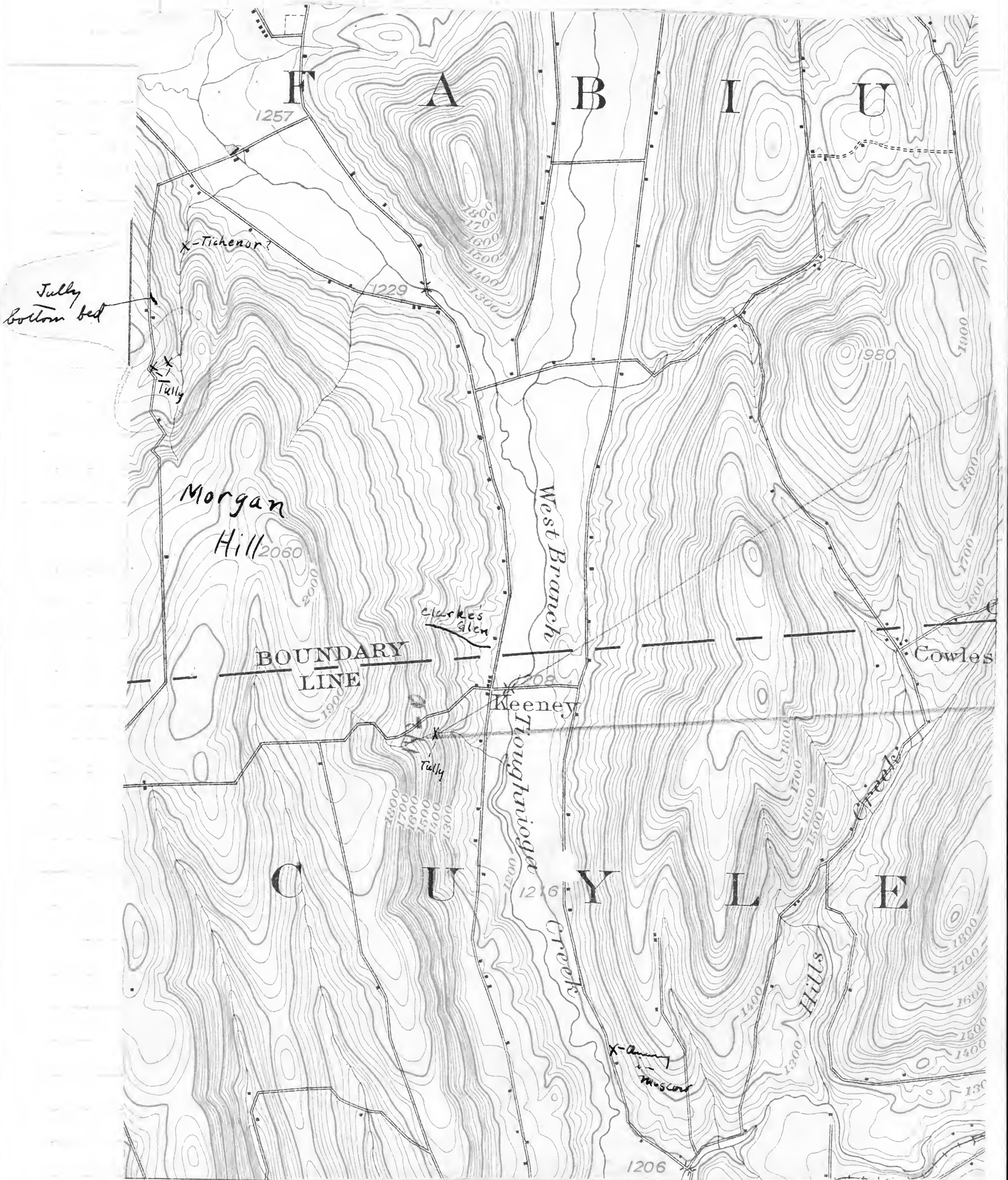


160K





1604





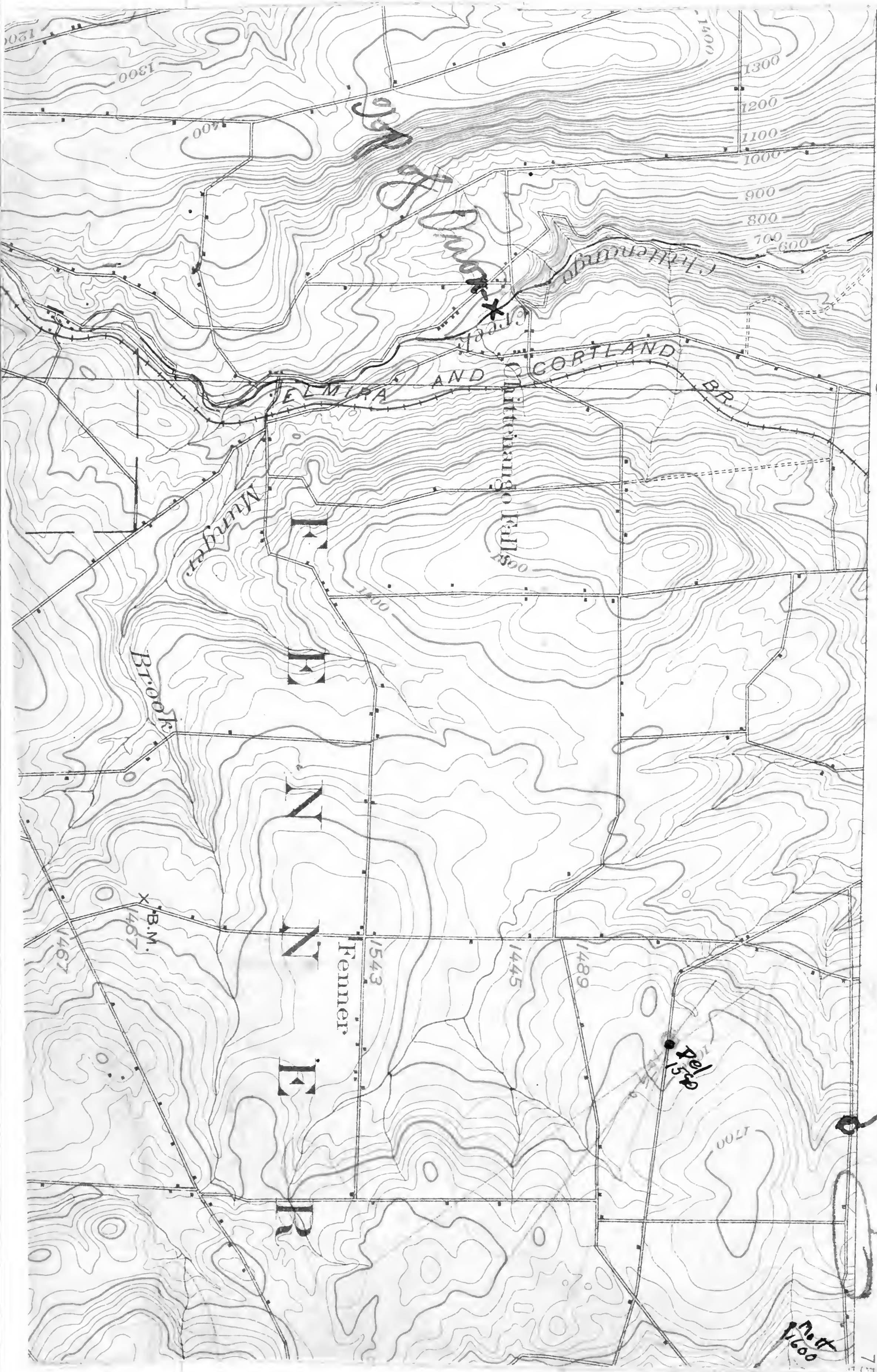
1931

160m

PHY  
YORK  
THE  
SURVEYOR

NEW YORK  
CAZENOVIA QUADRANGLE

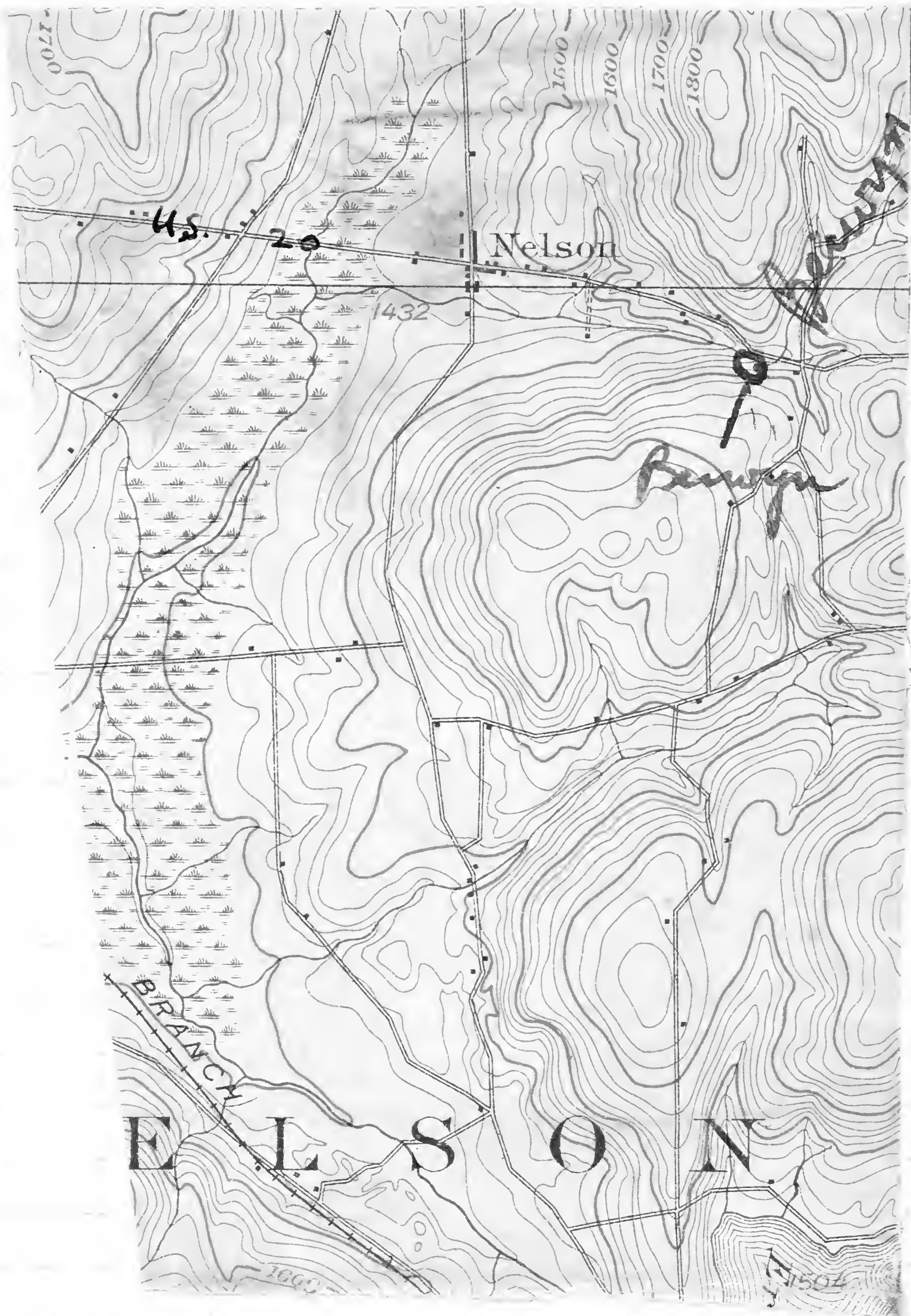
1931  
Mistville  
DePelle





1931

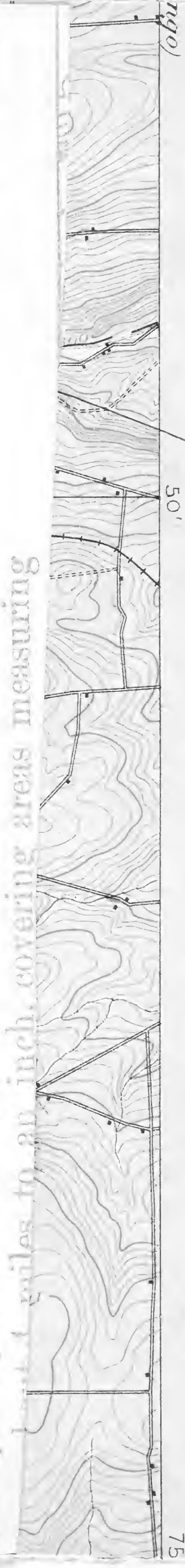
160m





ed graphic scales showing distances in feet, meters, and  
In addition, the scale of the map is shown by a repre-  
sitive fraction expressing a fixed ratio between linear  
measurements on the map and corresponding distances on the  
ground. For example, the scale  $\frac{1}{25,000}$  means that 1 unit on  
map (such as 1 inch, 1 foot, or 1 meter) represents 25,000  
units on the earth's surface.

he standard scales used on these maps are multiples of  
fraction  $\frac{1}{100,000}$ . Quadrangles in thickly settled or indus-  
trially important regions are mapped on a scale of  $\frac{1}{25,000}$  or  
1 mile to an inch, and cover areas measuring 15' in  
latitude and longitude. Quadrangles in less thickly settled or  
industrially less important districts are mapped on a scale  
of  $\frac{1}{50,000}$  or about 2 miles to an inch, and cover areas measur-  
ing 30' in latitude and longitude. Reconnaissance maps of  
sparsely inhabited regions have been made on a scale



NEW YORK  
QUADRANGLE

NEW YORK  
D BY THE  
AND SURVEYOR

APR 11

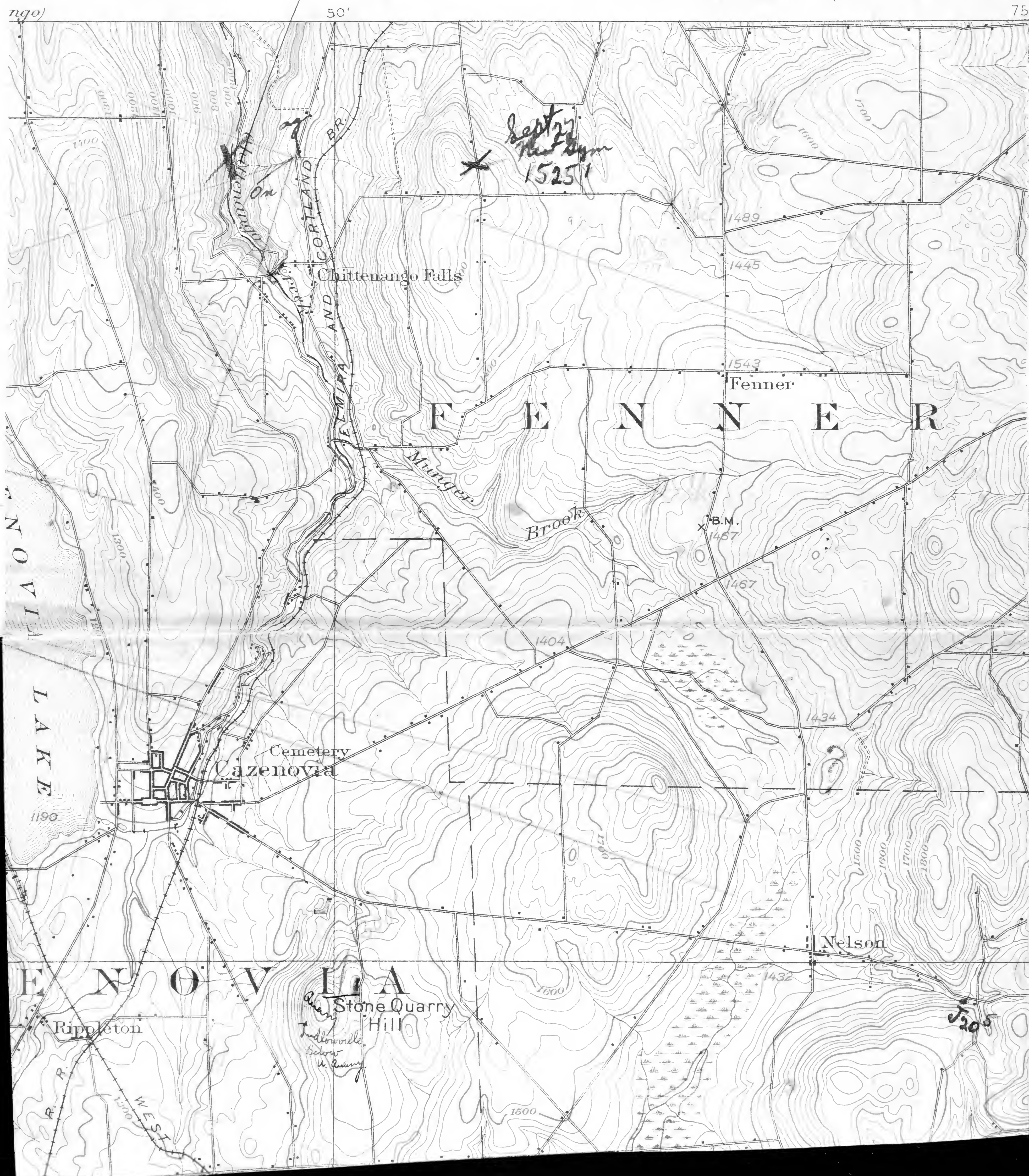
*Manuel de la  
Carta de  
Garcia*

1600



NEW YORK  
DRAWN BY THE  
ENGINEER AND SURVEYOR.

NEW YORK  
CAZENOVIA QUADRANGLE





...successive contour lines that  
 te a gentle slope; lines that are  
 slope; and lines that run to-  
 ur lines express altitude, form,  
 e below.



HO HLLVLL  
 TOPOG

exact altitudes—those of bench marks—as well as the ge-  
 coordinates of triangulation stations, are published in bul-  
 that are issued free by the Geological Survey.

The lettering and works of man are shown in black. I  
 daries, such as those of a State, county, city, land  
 township, or reservation, are shown by continuous or  
 lines of different kinds and weights. Metaled roads are shown  
 by double lines, one of which is accentuated. Other public  
 roads are shown by fine double lines, private and poor roads  
 by dashed double lines, trails by dashed single lines.

Each quadrangle is designated by the name of the pri-  
 city, town, or natural feature within it, and on the marg-  
 the map are printed the names of adjoining quadrang-  
 which maps have been published. Over 2,800 quadrang-  
 the United States have been surveyed, and maps of  
 similar to the one on the other side of this sheet have  
 published.

The topographic map is the base on which the geolog-  
 mineral resources of a quadrangle are represented, and  
 maps showing these features are bound together with a de-  
 tive text to form a folio of the Geologic Atlas of the U  
 States.

Index maps of each State showing the topographic map

160P

DE



160P

DEPARTMENT OF THE INTERIOR  
ALBERT B. FALL, SECRETARY  
U.S. GEOLOGICAL SURVEY  
GEORGE OTIS SMITH, DIRECTOR

TOPOG

STATE OF  
REPRESENTATIVE  
STATE ENGINEER  
(Chitt)

*This road  
upper Marcellus - Cardiff  
Shenandoah.*





ed by figures showing altitude. —such as road corners, summits, marks—are also given on the map to the nearest foot only. More marks—as well as the geodetic stations, are published in bulletins.

an are shown in black. Bound- e, county, city, land grant, town- a by continuous or broken lines s. Good motor or public roads , poor motor or private roads by dashed single lines.

ted by the name of a city, town, within it, and on the margins of mes of adjoining quadrangles of ned. Over 3,300 quadrangles in a surveyed, and maps of them her side of this sheet have been

e base on which the geology and rangle are represented, and the re bound together with a descrip- ne Geologic Atlas of the United have been published.

nd of Alaska and Hawaii showing hic maps and geologic folios pub- eological Survey may be obtained opographic maps may be obtained l maps are sold at different prices.

hrown from the northwest across purpose of giving the appearan he interpretation of the contour sents an imaginary line on the of which is at the same altitude could be drawn at any altitude ours at certain regular intervals line of the seacoast itself is a co- tude being mean sea level. The shore line if the sea should rise the shape of the hills, mountain altitude. Successive contour map indicate a gentle slope; lines ate a steep slope; and lines that

The manner in which contour and grade is shown in the figure

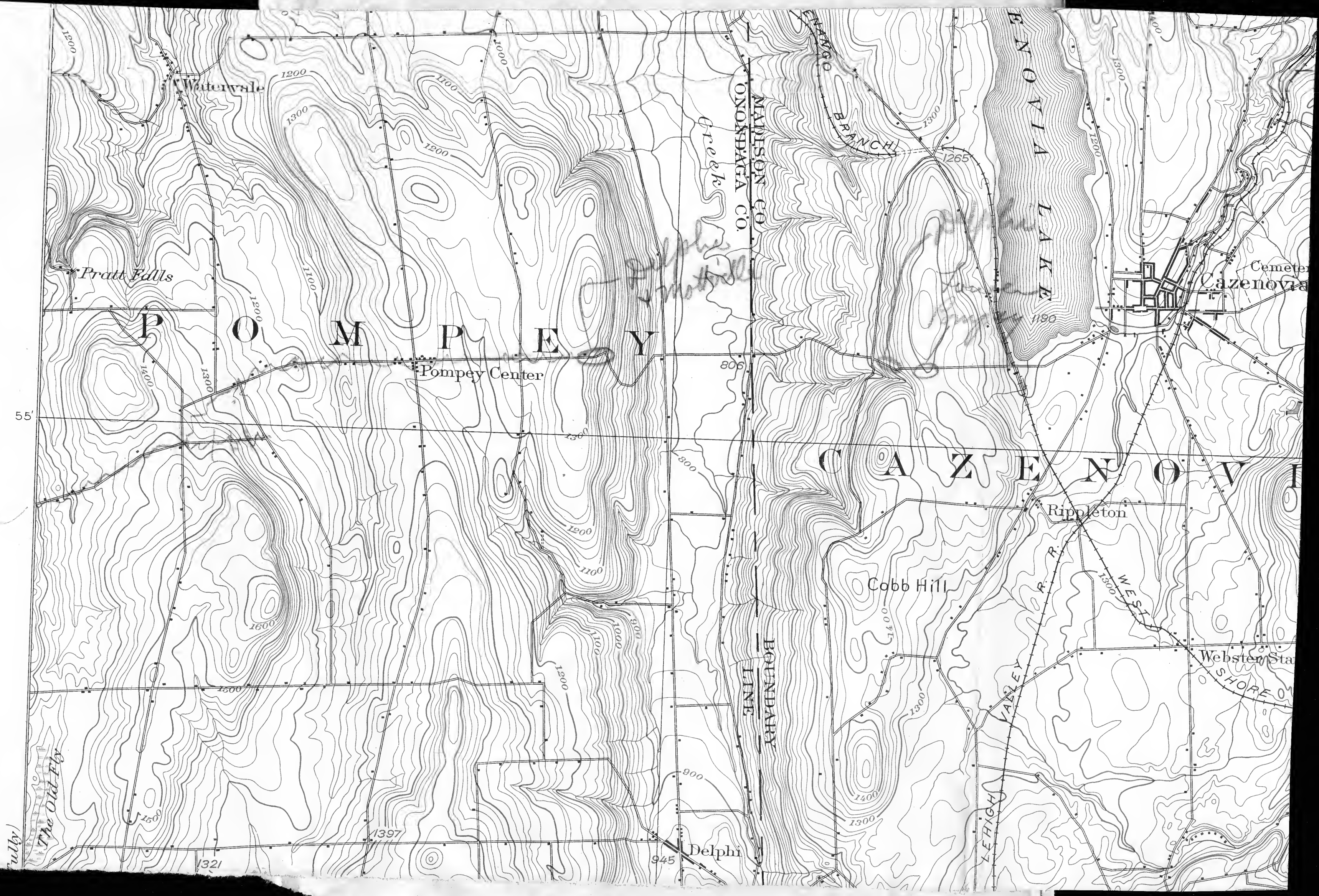




1608

us  
Hy 20

058











Let's see what we  
can find out about the  
Agonist.



the light shale must be from near the top and this is about 15' above the R.R. tracks at an elevation of about 1080' A.T. By hand level it was 20 steps up to the R.R. tracks & 2 more to about where the Randolph comes in. The Randolph by my level must come in about 23' hand level steps above the Agoniatites and then would give a thickness of 145' to the Marshallus.

At the lowest 4 steps were reached and the eighth was one step, so on the opposite side hand-leveling was begun. At the 5th step above the Agoniatites, on the east side of the white black shale were seen some thin step-like weathering forms of a black Agoniatite and only a short distance from the A.L. (20') was seen a large concretion very perfectly made. It was nothing but a perfect cone of that at several inches and had a most perfect center. It was about 3' in diameter. A small fragment of a fossil was seen near the side. The shale here gave a brown streak.

At the bottom of the 12th step there was a small concretion.

At 16 steps above the Agoniatites that is above the fossils and the contact was not so far from the fossils. The rock gave a somewhat lighter streak but a great deal of the same like that below.



The rock is also very faintly gilly  
 At 18 steps is a large flattened  
 concretion 3 1/2 in diameter. The  
 shales are fine stone at 16. The  
 streak on the edge of the green  
 faint brown fine small  
 appears dark blue black  
 and black.

At 20 steps is another large  
 concretion 2 in diameter. The  
 shales are very soft and  
 quite black.

21 - streak lighter, fine, the  
 fossils above it are black but  
 I can't see any.

22 - the shales are somewhat more  
 massive, slightly gilly and on the  
 surface have a blue appearance.  
 They also come out in curved layers  
 and break into thin chips.  
 I believe that ~~1103~~ 1105 is where the line  
 comes at. ~~1103~~ 1105  
 seen between 22 & 23 - about 21 up.

Streak at 21 is rather strong  
 and of a brick color.

The shale pieces on the slope are a  
 small variety at 31 weather to a  
 light tan or blue color.

The last rock seen was at 36 steps.  
 All of the Cardiff shales seen here and  
 all all uniform and the kind  
 that weather to a blue color.

$$\begin{array}{r} 225 \\ \underline{119} \\ 119 \end{array}$$

$$\begin{array}{r} 994 \\ \underline{119} \\ 1113 \end{array}$$







There is a large exposure about 12' vertical showing shales that break into small angular chips or sometimes into small rounded fragments. The shales are generally stained by iron rust. In cross-section they are a very dark grey and are slightly gritty to the touch. Some of the fragments are a brown having a weathering resembling "dressed varnish". The weathering of these weathered fragments is not the typical olive color of the Cardiff and it is that that they belong to the Hamilton.

300 paces upstream from the bridge and the route is very interesting from the bridge.

Between 1250 ~~feet~~ steps above the bridge the weathering is a little different but it found no fossils and would the fossils be in the Cardiff? The road is the Cardiff road and at the bridge the road shows the top of the shale. A large exposure was seen in the gutter about 20' above the bridge. About 50' above the 12th step some olive shale was noted on a thin bed but this was very agreeable to the blue grey shale. I

65  
865  
900

18  
13  
5  
20  
65  
865  
900



at the elevation of about ~~1275~~ <sup>1275</sup>  
 occurs coarse shales and sandstones  
 and hard. This hard sand can be seen  
 for about 3' below 1275 in the side  
 of the road. A train in the gully at  
 1275'. This rock contains large fossils  
 as:-

Nephriticeras sp.	A. dea
P. discoides	T. acuminatus
L. arcuata	P. arcuata
H. dehayi	C. acutulus
C. setigerus	P. arcuatus
C. mucronatus	P. arcuatus
P. spinulicosta	P. arcuatus

Below 1275' is a layer of about 2'  
 of soft sandstone and shales of greenish  
 and brown colors of greenish blue  
 tinge.

Some of the layers of this sandstone  
 1275' are quite calcareous and they  
 contain:-

C. arcuata	P. arcuatus
C. arcuatus	C. arcuatus
C. arcuatus	P. arcuatus
S. angulatus	C. boethi
M. pygmaea	S. cotallum
C. mucronatus	C. arcuatus
C. setigerus	C. arcuatus

1275' - 1280' - the shale just on the  
 level of which is about 4 feet or  
 thereabouts, is softer and contrasts  
 strongly with the rock below. It  
 has in the first 20' 3':-

C. boethi	C. arcuatus
P. spinulicosta	P. arcuatus
C. arcuatus	C. arcuatus



Fossils in shale to top of hill.

Shales at the bottom of the hill are  
rather soft & gritty & shaly.

*L. lund*

*H. ting*

*P. flabellum*

*P. concentrica*

*C. cratellum*

*S. acuminata*

*S. truncata*

*hemisphaera* sp.

*P. sassa*

*H. nichiloides*

*Cyrtotites*

*A. acuminata*

*P. spiriferata*

*Orthis* *Orthis*

*P. lund*

*L. lund*

*P. concentrica*

*Schuchertella* sp.

*P. lund* sp.

*P. lund*

*P. didymum*

*S. murinum*

*A. pinnata*

*A. scabridius*

*H. acuta*

Aug 31

Shales along road to the south of the  
just north of the tunnel. Shales are  
found near just south of the hill.  
Shales just below the hill. The lower  
shales are rather soft, gray, gritty  
shales with the following fossils:

*C. cratellum*

*M. pinnata*

*Schuchertella antitacta*

*Pol. concentrica*

*A. lund*

*P. spiriferata*

*Pol. concentrica*

*C. lund*

*S. acuminata*

*H. nichiloides*

*H. acuta*

*H. acuminata*

*Cyrtotites* sp.

*H. oblongata*

*P. lund*

*H. lund*

*C. concentrica*

*H. angusta*

*S. cratellum*

*H. truncata*

*P. flabellum*

*C. concentrica*

*M. concentrica*



<i>C. crinitus</i>	<i>P. flabellum</i>
<i>C. calaria</i>	<i>P. rana</i>
<i>S. andrea</i>	<i>C. crinitus</i>
<i>A. p. rana</i>	<i>M. crinitus</i>
<i>P. p. rana</i>	<i>P. l. rana</i>
<i>C. crinitus</i>	<i>M. crinitus</i>
<i>M. crinitus</i>	<i>C. crinitus</i>
<i>P. flabellum</i>	

... ..  
... ..  
... ..  
... ..

... ..  
... ..  
... ..  
... ..

... ..

<i>A. l. rana</i>	<i>P. flabellum</i>
<i>C. crinitus</i>	<i>P. rana</i>
<i>P. flabellum</i>	<i>M. crinitus</i>
<i>P. rana</i>	<i>C. crinitus</i>
<i>P. flabellum</i>	<i>M. crinitus</i>
<i>T. crinitus</i>	<i>C. crinitus</i>
<i>C. crinitus</i>	<i>P. flabellum</i>
<i>M. crinitus</i>	<i>C. crinitus</i>

... ..  
... ..  
... ..



Found in the coarse rock  
between 1288 + 1291 are:

<i>P. lirata</i> var.	<i>T. subcorymbosa</i> var.
<i>P. flabellum</i> var.	<i>T. ligula</i> var.
<i>N. angusta</i> var.	<i>T. brychi</i> c
<i>T. crataegus</i> var.	<i>N. oblonga</i> var.
<i>L. crotalaria</i> var.	<i>L. pappulana</i> var.
<i>O. thymum</i> var.	<i>L. lutea</i> var.
<i>N. triquetra</i> var.	<i>N. subulata</i> var.
<i>P. yulipina</i> var.	<i>T. brychi</i> var.
<i>H. brychi</i> var.	<i>T. brychi</i> var.
<i>E. pappulana</i> var.	<i>L. lutea</i> var.
<i>P. brychi</i> var.	<i>L. lutea</i> var.

1291' 2" - 1296' 8"

<i>M. mytiloides</i> var.	<i>T. brychi</i> var.
<i>P. principis</i> var.	<i>T. brychi</i> var.
<i>P. lirata</i> var.	<i>T. brychi</i> var.
<i>N. angusta</i> var.	<i>T. brychi</i> var.
<i>N. oblonga</i> var.	<i>T. brychi</i> var.
<i>O. thymum</i> var.	<i>T. brychi</i> var.
<i>N. triquetra</i> var.	<i>T. brychi</i> var.
<i>P. yulipina</i> var.	<i>T. brychi</i> var.
<i>H. brychi</i> var.	<i>T. brychi</i> var.
<i>E. pappulana</i> var.	<i>T. brychi</i> var.
<i>P. brychi</i> var.	<i>T. brychi</i> var.
<i>L. crotalaria</i> var.	<i>T. brychi</i> var.
<i>L. pappulana</i> var.	<i>T. brychi</i> var.
<i>L. lutea</i> var.	<i>T. brychi</i> var.
<i>N. oblonga</i> var.	<i>T. brychi</i> var.
<i>N. triquetra</i> var.	<i>T. brychi</i> var.
<i>P. yulipina</i> var.	<i>T. brychi</i> var.
<i>H. brychi</i> var.	<i>T. brychi</i> var.
<i>E. pappulana</i> var.	<i>T. brychi</i> var.
<i>P. brychi</i> var.	<i>T. brychi</i> var.

1296' 8" - 1302' 2"

Found in the coarse rock  
between 1296 + 1302 are:

<i>M. mytiloides</i> var.	<i>T. brychi</i> var.
<i>P. principis</i> var.	<i>T. brychi</i> var.
<i>P. lirata</i> var.	<i>T. brychi</i> var.
<i>N. angusta</i> var.	<i>T. brychi</i> var.
<i>N. oblonga</i> var.	<i>T. brychi</i> var.
<i>O. thymum</i> var.	<i>T. brychi</i> var.
<i>N. triquetra</i> var.	<i>T. brychi</i> var.
<i>P. yulipina</i> var.	<i>T. brychi</i> var.
<i>H. brychi</i> var.	<i>T. brychi</i> var.
<i>E. pappulana</i> var.	<i>T. brychi</i> var.
<i>P. brychi</i> var.	<i>T. brychi</i> var.
<i>L. crotalaria</i> var.	<i>T. brychi</i> var.
<i>L. pappulana</i> var.	<i>T. brychi</i> var.
<i>L. lutea</i> var.	<i>T. brychi</i> var.
<i>N. oblonga</i> var.	<i>T. brychi</i> var.
<i>N. triquetra</i> var.	<i>T. brychi</i> var.
<i>P. yulipina</i> var.	<i>T. brychi</i> var.
<i>H. brychi</i> var.	<i>T. brychi</i> var.
<i>E. pappulana</i> var.	<i>T. brychi</i> var.
<i>P. brychi</i> var.	<i>T. brychi</i> var.



*Onchocerca* sp. (slab) here the  
 following are found in association  
*N. angusta*, *L. laura*, *P. spinulosa*,  
*P. flabellum*, *G. setacea*, *G. angulata*,  
*Cyrtolite* sp., *Spirifer* sp.,  
*M. subulata*, *Spirifer* sp.,  
*P. acanthopora*, *P. acanthopora*,  
*C. benthii*, *A. brydi*,  
*M. cythodes*

1302 - 1307' 6"

<i>Spirifer</i> sp.	<i>A. acanthodes</i>
<i>P. flabellum</i> cc	<i>S. benthii</i>
<i>L. laura</i> cc	<i>G. spinulosa</i>
<i>N. angusta</i> cc	<i>G. setacea</i>
<i>P. spinulosa</i>	<i>Cyrtolite</i> sp.
<i>Cyrtolite</i> sp.	<i>Spirifer</i> sp.
<i>Spirifer</i> sp.	<i>P. acanthopora</i>
<i>P. acanthopora</i>	<i>A. brydi</i>
<i>P. discoidum</i>	<i>M. concentrica</i>
	<i>Th. sulcus</i>

1307 - 1312' 11"

<i>P. flabellum</i> cc	<i>P. discoidum</i>
<i>L. laura</i> cc	<i>P. acanthopora</i>
<i>N. angusta</i> cc	<i>Spirifer</i> sp.
<i>P. spinulosa</i>	<i>G. macroptera</i>
<i>L. laura</i> cc	<i>A. brydi</i> cc
<i>G. spinulosa</i>	<i>A. acanthodes</i>
<i>Cyrtolite</i> sp.	<i>M. concentrica</i>
<i>Spirifer</i> sp.	

1312' 11" - 1318' 4" The shales in this interval are very hard apparently sandstone. They have -

<i>M. concentrica</i>	<i>L. laura</i>
<i>G. brydi</i>	<i>A. brydi</i>
<i>Spirifer</i>	<i>G. setacea</i>
<i>L. laura</i> ?	<i>N. angusta</i>
<i>P. discoidum</i>	<i>P. flabellum</i>







Expenses by A. M. Frank



This layer is about 4' thick  
 and is composed of a hard  
 brownish gray sandstone  
 with thin layers of shale.  
 The fossils are as follows:

1. *Strophomena* (small)  
 2. *Strophomena* (medium)  
 3. *Strophomena* (large)  
 4. *Strophomena* (very large)  
 5. *Strophomena* (very large)  
 6. *Strophomena* (very large)

The bed is 125  
 feet thick and is  
 at the top of the hill and it  
 is composed of a hard sandstone  
 about 125 feet thick.

125  
 125



August 30<sup>th</sup>



Between 10 + 14 steps there is a  
limestone but at 14 comes shale like  
those below with

*S. arctus* *S. arctus*  
*P. spinulosa* *P. spinulosa*  
These shales are rather common

Fossils between 14 + <sup>17</sup>  
*Rap. ...* *P. ...*  
*Schuchertella* *S. ...*  
*C. ...* *S. ...*  
*C. ...* *S. ...*  
*P. ...* *S. ...*  
[coarse ribbed way] *S. ...*

The shales have a ... structure at 17 + 18

17 - 22 steps limestone  
Fossils 22 - 24 - ...  
*Specimen ...*

The ... shales by ... the road.  
... of ...  
... to not  
... after  
... for  
collecting.











... ..

\_\_\_\_\_







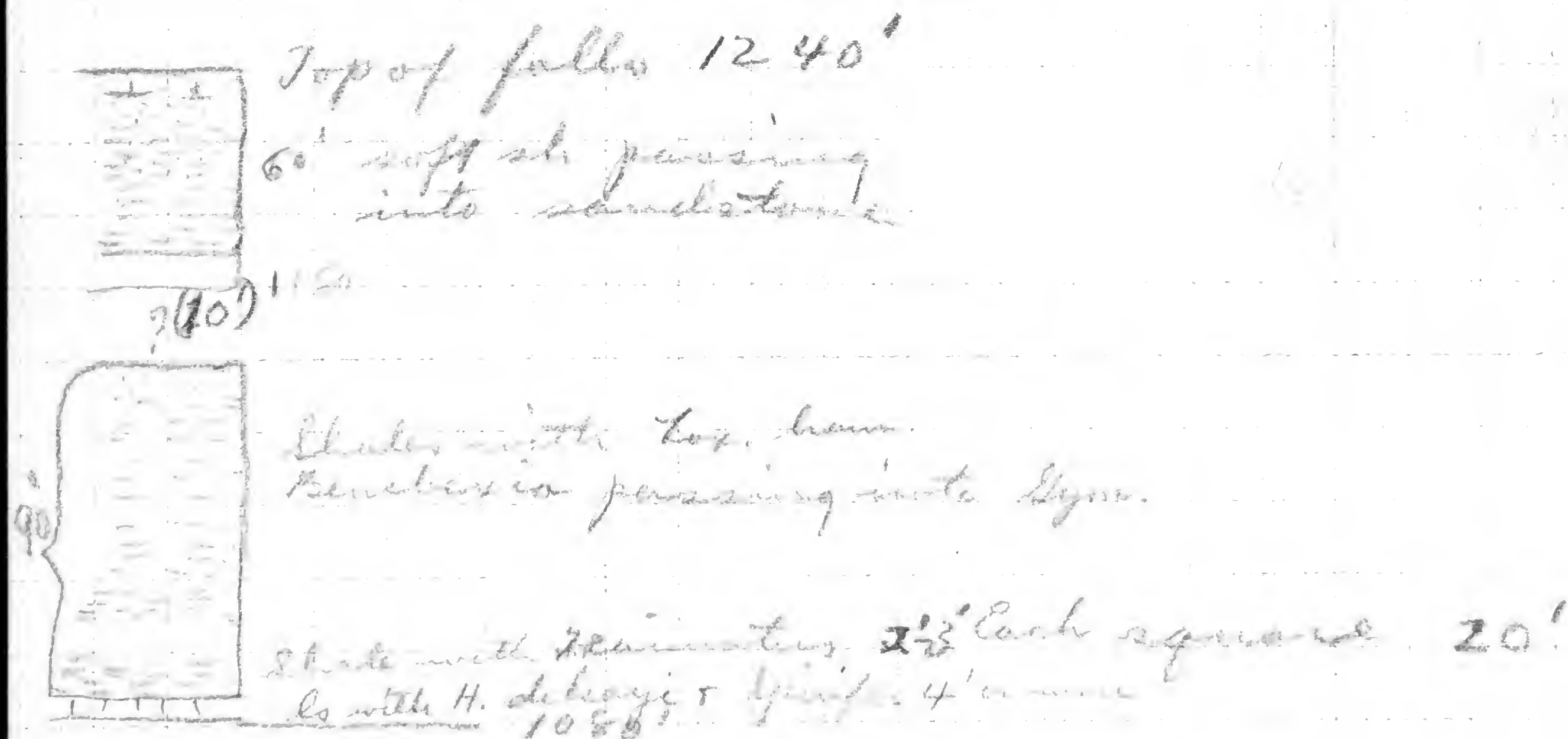
(1300)



## The falls at Pratt Falls

showed a continuous section of rock for about 170' from the lowest exposure noted. The topmost beds are the same as we have here on Electric Light Brook at the top of the falls. A hard layer occurs at about 1000' elevation and this hard band looks like the one we have in the lower falls at Chase's Glen. About 90' above this the rocks have many Mediomorphans and the typical aspect of the New Syn Quarry. I did not see the beds here that carry *A. reticularis* nor any blocks of it in the stream bed, but a considerable distance below the base of the falls, my recollection is that it is about 50' there was a sequence showing dark somewhat fissile shales, which stood in marked contrast to the coarser rocks above and below. These became coarser as the top of the falls was reached till they became a fine ss. with calcareous lenses made up entirely of fossils, notably *H. arguta*, *Reflabellum* and snails.

1300' dark shales, rather soft gitty.



The section at Pratt Falls is almost the same as at Upper Chase's Glen or in the Glen 5 miles NW of Morrisville.



The fossils at 182<sup>nd</sup> Falls are excellently preserved and the following were noted in large blocks from above:—

*L. macroptera* r  
*P. cylindrica* r  
*M. mytiloides*  
*M. alta*

*M. concentrica*  
*L. laura* r  
*L. grandiosa* r  
*N. triqueter*

*N. oblongatus*  
*C. conligata*

*C. elongata*  
*G. bisulcata*

*G. arcuata*  
*P. flabellum*

*G. rugosa*  
*J. submarginata*

*K. liata*  
*Pal. tenuistriata*

*P. maxima*  
*A. boydi*

*N. arguta*  
*Sphaerites* sp.

*Cystolites*  
*Orthoceras* sp.

*P. discoidium*

*A. fasciculatus*

*A. princeps*  
*A. scabidus*

*S. crotalum* c  
*Lingula debia*

*L. plena*  
*L. aspidium*

*R. grandis*  
*S. perplanus*

*Schuchertella arcto.*  
*C. coronatus*

*C. mucronatus*  
*P. spinulicosta*

*C. boothi*  
*G. obsoleta*

*N. oblongatus*  
*N. bellistriata*

*C. tenuistriata*  
*Par. hamiltoniae*

*Leipteria* sp.  
*A. undulata*

*P. radiata*  
*B. leda*

*P. pectus*



$$\begin{array}{r} 1016 \\ 60 \\ \hline 11301 \end{array}$$

$$1173 \quad (68)$$

$$\begin{array}{r} 1173 \\ 90 \\ \hline 1263 \end{array}$$

$$\begin{array}{r} 1200 \\ 1060 \\ \hline 2260 \end{array}$$

$$3.25 \quad \begin{array}{r} 200 \\ 1900 \\ \hline 30 \end{array} \quad \begin{array}{r} 61 \\ 66 \\ \hline 127 \end{array} \quad (63)$$

$$\begin{array}{r} 2.6 \\ 65 \\ \hline 78 \\ 6 \\ \hline 1638 \\ 1641 \end{array}$$

$$1416$$

$$1137$$

$$\sqrt{37}$$



Sept 15.  
Pratt Falls

1928

Below sand layer ~~from~~ just  
the rock is a shale, rather massive,  
sandy. (0-300 paces) ~~significantly~~  
At 315 paces the rock is thin and is  
little like the shale.

*A. aduncula* c

Small corals

*C. uncinata*

*C. uncinata*

At 376 paces ~~the~~ sand layer about  
1' thick. ~~the~~ sand is ~~thin~~ ~~in~~ ~~the~~  
thin sand layer at 5' or  
hard sandy, which is ~~the~~ ~~the~~  
hard nodules are a ~~very~~

*C. uncinata*

*L. pygmaea*

*A. decussata*

*A. gracilifera* ~~is~~ ~~at~~ ~~the~~ ~~the~~  
hard ~~the~~ ~~was~~ ~~seen~~

*A. aduncula* c

*C. uncinata*

*L. pygmaea*

*C. uncinata*

Small corals

*A. aduncula*

*C. uncinata*

*C. uncinata*

*C. uncinata*

*C. uncinata*

*C. uncinata*

*C. uncinata*

rock ~~was~~ ~~seen~~ ~~at~~ ~~the~~ ~~the~~  
layers.

At 386 the ~~the~~ ~~is~~ ~~the~~ ~~stream~~ ~~bed~~

About the ~~the~~ ~~is~~ ~~the~~ ~~stream~~ ~~bed~~  
shale is ~~the~~ ~~the~~ ~~the~~ ~~the~~ ~~the~~  
soft ~~the~~ ~~the~~ ~~the~~ ~~the~~ ~~the~~  
stone which is a ~~the~~ ~~the~~ ~~the~~ ~~the~~ ~~the~~  
hard ~~the~~ ~~the~~ ~~the~~ ~~the~~ ~~the~~  
and the top of which is 16' above the  
mottled layer.

*A. uncinata*

*C. uncinata*

*A. uncinata*

*C. uncinata*

*A. uncinata*

*C. uncinata*

*A. uncinata*

*C. uncinata*

*A. uncinata*

*C. uncinata*



*A. section*  
*A. decussata*  
*C. conjugata*

*M. conjugata*  
*C. conjugata*  
*P. hirta*

10' from top of *Tropidoleptus* bed to base of  
 falls rock bed. Containing 11 steps or 55-60'

*D. affinis*

10'  
*D. affinis*  
*C. conjugata*  
*Tropidoleptus*  
 16'  
*Tropidoleptus*











5'5" - 10'10" above 204<sup>th</sup> paces - mainly  
 low lying. *Hexamer* common.

*M. subulata*

*H. radialis*

*P. rana*

*Pf. concentrica*

*L. laura*

*C. brachy*

*P. lirata*

At 5 steps above the first - just below  
 the falls and at 32' above 1095'  
 the rocks at the bottom of the gully  
 are soft shales breaking into small  
 pieces but become progressively  
 coarser and break into sandy  
 fragments. Fossils from 30'30" to  
 35'35" are -

*P. lirata*

*P. lirata*

*M. subulata*

*M. subulata*

*P. rana*

*B. sulcata*

At about 1025' for example is a layer  
 of the hard band seen just  
 downstream is again encountered.

Just below the hard band at  
 40'40" on 1030'4". It is about  
 4' thick. The shales have become  
 progressively coarser to just  
 below the band, but the band is  
 very hard and resistant and  
 stands out in contrast to the  
 rocks below. On the band the  
 shales are somewhat like those  
 just below the band as they  
 break into heavy pieces.

Fossils on the hard band are  
*P. phyllina*, *A. fasciculata*,

On the coarse shales above the  
 band the fossils found are

*M. subulata*, *M. arguta*



3



The top of the pit entered us  
at about 1070' alt. and fully covered  
the pit. The top of the  
New-Land-Lowland.



*G. thurberii*

Mr. [unclear]

1. *Phragmites*







H. Schuyler

H. Schuyler

S. Schuyler

G. Schuyler

H. Schuyler

H. Schuyler

H. Schuyler

For further information see the  
 Schuyler Schuyler Schuyler  
 and Schuyler Schuyler Schuyler

On the way up the mountain  
 Schuyler Schuyler Schuyler  
 with Schuyler Schuyler Schuyler  
 C. Schuyler Schuyler Schuyler  
 very much Schuyler Schuyler  
 with the Schuyler Schuyler  
 grey Schuyler Schuyler Schuyler  
 Schuyler Schuyler Schuyler

H. Schuyler

Schuyler Schuyler

Schuyler Schuyler Schuyler

Schuyler Schuyler

Schuyler Schuyler Schuyler

Schuyler Schuyler Schuyler

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Schuyler Schuyler Schuyler



is 59' 7"

Some of the stone at the base of the upper falls is a rather good size. The lower part of the stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The top of the stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

One top of the stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size. The bottom of the stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

A. The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

Put up the stone in a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

457 pieces upstream date which soft etc.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.

The stone is a rather soft, silty, grayish, and the upper part is a harder, more crystalline, and is a rather good size.



At 981 feet we saw a thin  
in a 2" bedded ss.  
which showed a thin  
or ridge of the cliff  
a bed of ss. in the  
to a 70' at the top of the  
a thin bed of ss. in the  
was.

At 1284 feet we saw the  
of the Latic. Limestone  
and the remains of the  
considerably.

A lot of the thin bedded  
& Latic. Limestone  
these are probably



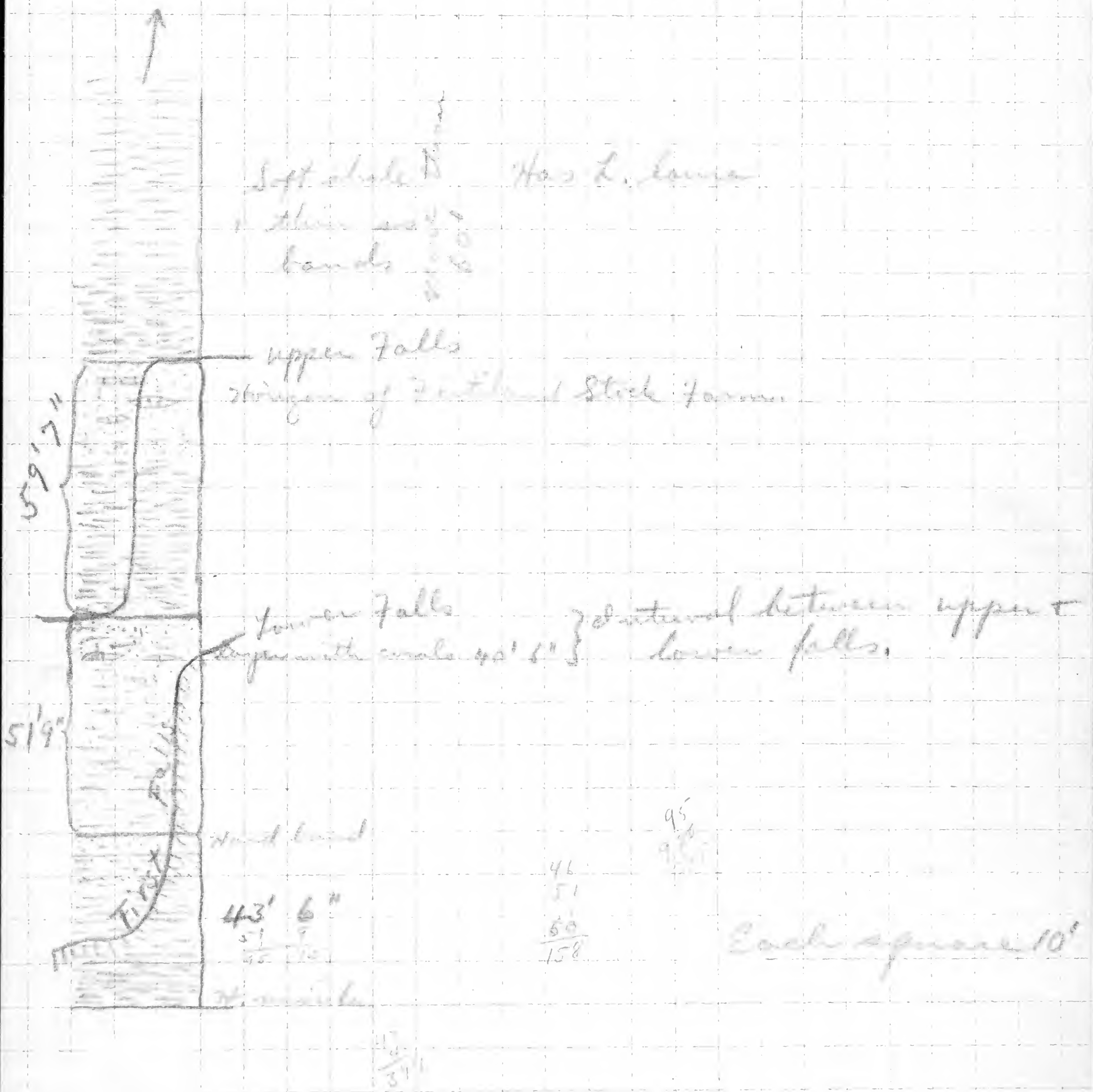
Stone Quarry hill  
 Green shale and sandstone  
 with  
 L. laura  
 C. ...

Sandstone is present at the  
 bottom of the hill. Are  
 these H. ...

Quarry is about 25' high. This was composed mostly of dark blue grey shaley sandstone containing L. laura distributed thru out. The rock probably belongs somewhere near the Quarry horizon. It is quite definitely Ludlowville and must be near the top of the sandy rocks above the Nyassa & Emma zone.



Section at Delfhi Falls





The lowest rocks contain *Trinotoma* *minuta* and a fauna such as is found on the soft shales with *Platylasma*. The fossils, especially the *Gastropoda* are excellently preserved in this horizon. *Bambesia* predominates over the other forms.

About 10' above the rock the *Lyonema*s become quite abundant. These soft dark shales with *Bambesia* etc. soon become sandier and break into rather large fragments and this tabular bed is 3' or 4' above stream. At about 1031' is a 3' 4" band of hard sandy and slightly calcareous rock which forms a marked ridge along the cliffs but loses its identity in the face of the falls. Above this band for about 51' 9" the rocks are rather coarse being sandy sh for about 30' but becoming finer above with frequent *epilemna* bands and lenses composed mostly of fossils. One of the last *Zaphrentis* corals is at about 40' 6" above the bed band.

The top of the *Gym* horizon here is not marked by calcareous lenses of *C. coronatus* and *A. reticularis* & *A. cor* but is a transition of a few inches into a rather dark soft, and fine shale. These shales again become coarser and the fossils larger till sandstone appears. The *Fertile* of *Stark* *Farm* horizon is about 15' thick or more the exact line could not here be determined.

On the top falls the alternating series of fine shales and thin as here the appearance of similarly situated rocks in the Bear Mtn. ravine.



And thus, at the **197** top of the **197**  
fertile horizon is probably where  
the line dividing <sup>the</sup> Yellowville from the  
Shonates comes. As I recall it this  
horizon at Yellow Falls including  
the rock in the stream by the road  
is near 100' thick.



List of exposures to be  
Photographed

Marcellus - with corals, etc. in west of base

Barberton - Railroad cut south of base



Aug 29.

Cory Good  
1976

594  
3:30  
56

Railroad Tunnel

At the west entrance to the RR. Tunnel is a large exposure of about 30' of rock. It is at the base and for 20' a dark grey sandy shale that grumbles to small flatish fragments. Fossils are plentiful in small patches and are chiefly brachiopods. The prevailing form is *D. umbonata*. Other fossils occur in the 20' below the hard layer.

*L. perplanaria* n  
*P. arctata* n  
*C. umbonata* n

*L. trilinea* n  
*Leptostrophia* sp. n  
*Pac. laticosta* n  
*D. umbonata* n

The last 20' of rock are covered by a caliche layer containing thick layers of *D. umbonata*. Fossils are as follows:

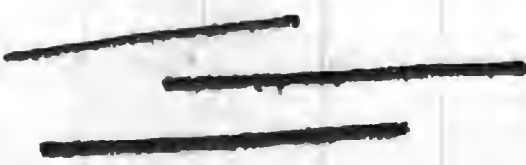
*C. umbonata*  
*D. umbonata* a  
*P. arctata*  
*C. umbonata*  
*C. umbonata*  
*C. umbonata*  
*C. umbonata*  
*C. umbonata*

*D. umbonata*  
*D. umbonata* c  
*C. umbonata*  
*H. delongi*  
*C. umbonata*  
*C. umbonata*

This bed is composed of a hard layer of sandstone and shale. It is a thin bedded layer of sandstone. The sandstone forms a ledge in the cliffs along the RR. cut.

Above the hard ls. ledge is about 8'-10' of hard sandy / calcareous shale devoid of fossils except for a few scattered *P. arctata*.

*P. arctata*





1/2

1/2

1/2

1/2







$$\begin{array}{r} 51 \\ 510 \\ \hline 271 \end{array}$$

$$\begin{array}{r} 575 \\ 510 \\ \hline 94 \end{array}$$

$$\begin{array}{r} 800 \\ 5 \\ \hline 160 \end{array}$$

$$\begin{array}{r} 2700 \\ 32 \\ \hline 84000 \end{array}$$

$$\begin{array}{r} 532 \\ 274 \\ \hline 1468 \end{array}$$

$$\begin{array}{r} 49 \\ 10 \\ \hline 59 \end{array}$$



Sept. 5. 200

1927 200

Handlevelling begun at 1245'

Lower South of Fabius

3 steps - blue grey shales with  
*O. carinata*, *U. antiquata*, *T. carinata*,  
*U. varicosa*, *U. oblongatus*, *Pal. concentrica*,  
*S. tellus*

4<sup>th</sup> step about 10' of ~~shales~~ <sup>sandstones</sup> exposed  
 They are shaly below and gradually  
 become sandy above. *S. pennatus*,  
*B. submarginata*?, *P. emarginata*.  
 The top of the ss, which is bluish  
 and heavy bedded is at 6<sup>th</sup> step.

The top layer is calcareous and  
 has many shells in it, especially  
 small *Spinifers*, *A. umbonata* and  
*T. carinata*.

The top fossiliferous band is about 20"  
 thick. The ss below yielded few fossils

30-35<sup>35</sup> Blue grey gritty shales breaking  
 into small fragments. These have  
 at the base

✓ *C. coronatus*  
 ✓ *T. carinata* c  
 ✓ *C. bellistriata* c  
~~*P. flabellum*~~  
 ✓ *D. sculptilis*  
 ✓ *U. concentrica*

✓ *P. flabellum*  
 ✓ *S. pennatus* c  
 ✓ *S. arcuata*  
*S. magna*?  
 ✓ *A. spinifera*  
 ✓ *C. scutellus*

35-35 to 40-40" Same as below as to fauna  
 but becoming much coarser

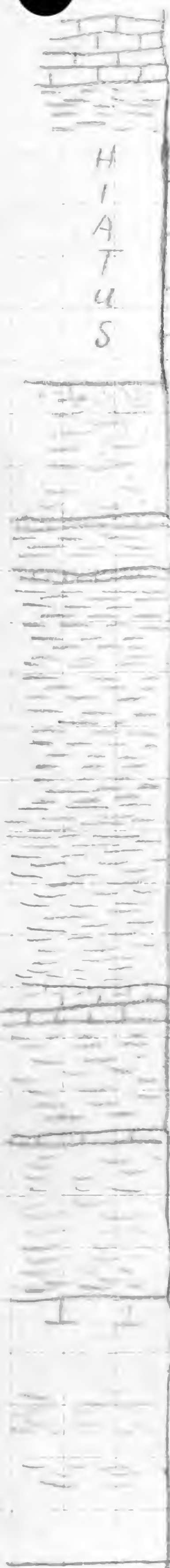
*S. banaltensis*

*Leptena*  
*Trochus*

40' 40" - 45' 45"

Same - *S. perplana*, *A. spinifera*,  
*A. reticularis*, *P. flabellum*, *P. emarginata*





H  
I  
A  
T  
U  
S

10'

80'

25'

10'

75'

a. umbonata

shale + ls. 5' 5"

1337' A.T.

28'

27'

9" calcareous arenaceous band (S. denissa, Mytilus)

32' 6" Blue gray shale alternating with harder arenaceous bands

32' 6"

Limestone

1245'



*C. belliculata**C. coronatus**P. patulus**H. oblongatus*

45'45" - 50'50" - same shale - *H. dekeyi*  
 50'50" - 55'55" Rock coarser forms  
 a cascade and is less fossiliferous  
*Camarotoechia congregata*, *T. carinatus*,  
*H. dekeyi*, *S. perrinites*. At 55'55" the  
 rock is hard rather thick bedded  
 light brown ss.

55'55" - 60'60" comes a hard band of light  
 blue gritty ls. with

*C. boothi**S. perrinites* cc*S. tullius**H. dekeyi**S. demissa*

32'

32'

This stone is about 9" thick

60'60" - 65'65"

On this is a sandy rock with many  
 fossils

*P. flabellum**T. carinatus**S. demissa* c*P. oviformis**S. granulatus**R. truncatus**P. princeps**S. perrinites**A. serpens**S. perplana**M. concentrica**C. belliculata*

A little higher up the rock is softer  
 about 10' below 65'65"

These softer rocks contain

*S. perrinites**S. granulatus**S. perplana**S. 9**P. oviformis**T. carinatus*





1. *[Faint handwritten text]*



## Chaetetes

These shales have the look of those below the *S. demissa* band. The coarse rock for about a foot above the *S. demissa* band must belong to it also.

65'65" - 70'70" - hiatus

70'70" - 75'75" - blue grey shales

75'75" - 85'85" - *Pal. concentrica*, *S. pennatus*, *C. bellistruata*, *J. carinatus*, *S. granulosa*, *C. scutulus*, *Grammysia* sp., *C. tenuicostatus*.

85'85" - 85'85" - At the top of this interval comes a 28" band of blue grey ls., shaley in places but compact or subcrystalline in others. It has *S. perflava*, *J. carinatus*, *Camastorchia* sp., *S. granulosa*.

85'85" - 90'90"

In its weathering & fine grain it is not unlike the Tully but is much darker, & it has markings like fucoids or plant stems. In places where fossils abound it is but thin. The upper 3" are quite dark and gritty.

The interval of rock for 5'5" above the ls. is a hard calcareous shale with *Agathaphylla*, *S. pennatus*, *J. carinatus* & *Crom. Hamiltoniae*.

A hard band of ls. about 3-6" thick ends this str. Abundance of

*J. carinatus* was noted above the Tichenor in the Bucktail ravine at Spafford Valley.

A coral was seen in this ls. at 90'90"



90'90" - 95'95"

Bluish shales succeed this ls and they have:-

*S. pennatus* cc*J. carinatus* cc*Pal. concentrica* c*C. boothi**U. triquetra**M. pygmaea**C. scitulus**M. corbulariformis**P. discordeum*

95'95" - 100'100" - hiatus

100'100" - 105'105" - "

105'105" - 110'110" - At 105'105" a very small

exposure reveals bluish shales with abundance of *A. umbonata*, *C. coronatus*, *C. micronatus*, *M. concentrica*, *A.*

*profundus*, *R. fruticosa*, *P. marginata**R. vanuxemi*, *P. plana*, *S. andaculus*

110'110" - 115'115" - hiatus

115'115" - 120'120" - hiatus

120'120" - 125'125" - Blue grey shales,

*U. triquetra*

125'125" - 130'130" -

Blue grey shales with - *C. bellistata**C. scitulus*, *P. discordeum*, *P. plana*,*M. lirata*, *M. varicosa*, *C. setigerus*,*M. pygmaea*, *Lox. hana*, *U. triquetra*,*H. dekeyi*, *P. plana*, *P. tenuis*,*P. plana*, *P. oblata*, *S. pennatus*,

135'135" - 140'140" -

*J. carinatus*, *P. plana*,



140' 140" - 145' 145" same as above

145' 145" - 150' 150" - *P. discordans*,  
*S. perversa*, <sup>15'</sup> <sub>16</sub>

150' 150" - 155' 155" same blue grey shales

155' 155" - 160' 160" - *P. concentrica*,  
*C. mucronatus*, shales for most  
part not greatly fossiliferous.

160' 160" - 165' 165" - *C. tenuistriata*, *S.*  
*granulosus*, *C. coronatus*, *T. cainatus*  
*R. fimbriata*, *S. pelyptus*, *S. arcuata*

165' 165" - 170' 170" - a foot above ~~165' 165"~~  
is a hard band, *S. pinnatus*, *R. variegatus*  
*A. reticularis*, *S. granulosus*, *M. oviformis*  
This band looks like the horizon  
with *P. oviformis* at Georgetown.  
*R. fimbriata*, *S. inaequistriata*. In  
places it is highly calcareous.  
*S. concava*. This band is about 3-6".

170' 170" - 175' 175"

In this band are 10' of rocks with  
1 1/2' of sandy shale at the top. *Trematis*  
and large *Strophodontes* are common  
here.

175' 175" - 180' 180" coarse shales, sandy,  
irregular fracture *P. patulus*, *C. lepta*

180' 180" - 185' 185" - same

185' 185" - 190' 190" - minus 1' - a hard  
calcareous sandy band with gritty sh  
& so above.



Above this, are about 10' of shales with occasional thin sandstone bands *S. pennatus*

### Jully

Below Jully about 1 foot of dark shales with *P. carinatus*, *P. arcuatus*, *S. pennatus* etc., *P. spiriferoides*, *S. subquadratus*, *M. subquadratus*, *M. subquadratus*, *P. subquadratus*, *P. subquadratus*. The rock just below the Jully is rather coarse, shaly with some fossils. The greatest depth of Jully is then and is about 1 foot.

#5 up from the base of cutgides is abundant in a thin layer. The rock is ~~4~~ 4' thick for 4' above the 1' of hard slate the base is dark blue grey shale. 1' from the bottom *H. cuboides* is associated with abundance of *S. pennatus*.

The Jully is at about 1525 A.T. on the farm of John M. Hartnett.

The Sherburne was seen at 1600 A.T. The Jully is seen ~~at~~ under the bridge in the gully but not beyond. Nearly 20' of Jully did appear, and about 8 or 10' of the Monrovia below.



Sept 11.

Fabius Ravine

The one foot band of shell ls is rather pure for 6" on the bottom and here has many shells but above it becomes quite shaly and passes into shale. In the upper 6" *C. coronatus* is very abundant. Other fossils are *J. carinatus*, *S. perplanus*, *S. pennatus*. Two doubtful shells are *S. denisoni* and *P. covenensis*.

In the shale on this band that forms the falls has -

*P. flabellum* re

*S. pennatus*

*C. coronatus* c

*J. carinatus* c

*P. ab. concentrica*

*C. bellistriata*

The shale on the falls for about 3 or 4' abundant in *S. pennatus* & *J. carinatus*. *C. coronatus* appears to be limited to the horizon at the bank of the falls. The *S. pennatus* are all long-winged. Fossils noted in the upper shale are: - *S. pennatus*, *J. carinatus*, *S. arcuata*, *P. radiata*, *N. triguter*, *N. oblongatus*, *Pal. fuscus*, *M. pygmaea*, *Ancilepterus* sp., *C. scutellus*, *Ca. sphaeroides*, *D. sculptus*.



Fossils about 8' above base of first falls:-

*Gon. hantzschensis*  
*C. bellistriata*  
*S. perplana*

*J. exigua*  
*Tentaculites* sp  
*B. crenistria*

0-0 — 10' 10" —

*J. carinatus* cc  
*S. pennatus* c  
*A. princeps* r  
*A. erectum* r  
*M. concentrica*  
*C. scutulus*  
*A. reticularis*

*C. bellistriata* c  
*S. rugosa*  
*P. rana*  
~~*A. spurioides*~~  
✓ *P. flabellum*  
✓ *A. spurioides* r  
✓ *P. lanceolata*

Lenses of shell ls. are to be noted here made up of *S. pennatus*, *J. carinatus*, & *C. scutulus* & *C. bellistriata*

10' 10" — 20' 20" — the rocks between this interval become sandier. The fauna here follows:-

*H. dehaegei*  
✓ *S. pennatus* c  
*C. bellistriata*  
✓ *J. carinatus*  
*C. conigata*  
✓ *S. chertungensis*  
*P. flabellum* r.

*P. liata* re No.  
*H. bellistriata*  
*H. liata*  
*S. arcuata*  
*P. lanceolata*  
✓ *S. granulosa*  
*M. concentrica*  
*P. potulus*



20' 4" — 30' 30" + 2' Shale becomes a  
 yellow-brown ss. with  
*P. flabellum* c. *M. concentrica*  
*S. perplana* *C. coronatus*  
*T. carinatus* c. *S. pinnatus*  
 Wood.

The last 1 1/2' of this ss. becomes calcareous  
 at 25' 25" this ss. has large  
 spherical concretions with fossils  
 of *S. pinnatus* & *T. carinatus*.

The top of the falls at 32' 30" above  
 the first falls has a blue grey sandy  
 ls. crowded with fossils in places  
*S. demissa* *S. tullius?*  
*S. pinnatus* *S. capillaria*  
*H. dehayi*  
*C. boothi*

This goes into a gritty sh. with  
*T. carinatus*.

*P. flabellum*

About 2' above, the shale is a  
 what is very and has the following

✓ *A. reticulatus* re.

✓ *P. flabellum* re.

✓ *T. carinatus* c.

✓ *C. induta*

*C. boothi* r

*Platyceras* sp.

✓ *S. demissa* re.

✓ *P. obiformis*

*Cystodictya*

✓ *S. perplana*

*A. bulbosus*

✓ *G. princeps*

✓ *G. granulatus*

✓ *G. serpens*

*Tentaculites*



A foot or 2 higher up the shale is bright blue gray and has:

✓ *C. coronatus*  
 ✓ *M. concentrica*  
 ✓ *S. denudata*  
 ✓ *A. reticularis*  
 ✓ *P. oviformis*  
 ✓ *P. flabellum*  
 ✓ *C. belustriata*

✓ *S. pennatus* cc  
 ✓ *T. cuneatus*  
 ✓ *S. perpluma*  
 ✓ *C. scitulus*  
 ✓ *S. capellaria*  
 ✓ *Par. hamiltoniae*  
 ✓ *S. granulosa*  
*C. boothi*

In the ten' feet below the "Tichenor" fossils are abundant but of few kinds. *C. scitulus* abounds. *S. pennatus*, *Stenoporella* and *Goniophora* are also present. The so-called Tichenor comes at about 1336 or 1340'

### Tichenor

About 28" thick smooth blue gray ls. weathering to a tawny or yellow gray. It has the appearance of the Tully. The lower portion of the lower layer for about  $\frac{1}{2}$ ' is very fossiliferous, the middle, almost not at all, the upper layer has some crinoid debris and a few shells as *S. granulosa*. There are 3 layers, the upper  $\frac{3}{4}$ " thick, the middle 11" thick, and the lowest layer 11".

An inch of shaly ls. on the bottom has many specimens of *C. scitulus*.



1. Introduction

The purpose of this study is to investigate the effects of

the independent variable on the dependent variable.

The study was conducted in a controlled environment

using a sample of participants.

The results of the study are presented in the following

sections.

The first section discusses the methodology used in the

study.

The second section presents the results of the study.

The third section discusses the implications of the

study.

The fourth section concludes the study.

The fifth section discusses the limitations of the

study.

The sixth section discusses the future research

needed in this area.



● On top of the Trilobite there is about  $1\frac{1}{2}$ ' of shaley ls. quite resistant and with *S. pennatus* & abundance of *T. carinatus*.



Have at Keeney  
Handlevelling at 12/18

At Keeney, the shale is a hard sandstone  
the strata with the 4' 6" of  
shales below. The shales are dark  
blue grey and are only very slightly  
quartzitic. They contain a few  
fragments of fossils but no  
individuals were observed:

<i>A. carinata</i>	<i>C. setigera</i>
<i>A. pumila</i>	<i>C. scutellata</i>
<i>O. trisecta</i>	<i>N. papposa</i>
<i>A. bilobata</i>	<i>N. papposa</i>
<i>P. setigera</i>	<i>C. scutellata</i>
<i>N. pumila</i>	<i>C. bellistriata</i>
<i>J. subquadrata</i>	<i>S. scutellata</i>
On the sandstone is a 1' band of shale, very micaceous and with <i>S. elongata</i>	
<i>A. carinata</i>	<i>Schuchertella</i> sp.
<i>A. angulata</i>	

On the hard band are shales like  
those below with

*A. carinata*  
*A. lida*  
*N. corbuliformis*  
*J. subquadrata*  
*N. bellistriata*

210

Between 17 & 18 steps the following  
in a shale

<i>N. corbuliformis</i>	<i>J. subquadrata</i>
<i>O. trisecta</i>	<i>A. carinata</i>
<i>C. scutellata</i>	<i>N. bellistriata</i>
<i>C. setigera</i>	<i>P. setigera</i>



*N. bethestrata*  
The shells are blue green and  
break into irregular flinty  
clayey.

*I. arcuata*

*Calymene* sp.

*C. coronatus*

*Taenium*

A local bedding of the rock  
between 19 & 20 covered a 3' cascade.

*H. trigaster*

*P. patulus*

*M. concentrica*

*S. granulatus*

*S. cephalus*

*P. rana*

20-21 The rocks are rather sandy and  
form a 2' cascade in the stream.  
Fossils at 21 are *Pol. concentrica*,  
*I. coronatus*,

21-22 —

*N. varicosa*

*N. bethestrata*

*C. terminatus*

*E. patulus*

*E. boethi*

*P. rana*

*C. bethestrata*

*S. solenoides*

*I. coronatus*

*Productella* sp.

*S. granulatus*

*S. ellipticus*

*B. lida*

*C. boethi*

*Pterinopecten*

*E. umbonatus*

*S. pernatus*

*M. pyramis*

*H. elongatus*

*S. arcuata*

*C. coronatus*

*S. cristatus*

*B. capillatus*

*C. terminatus*

*I. coronatus*

*Pol. concentrica*

*P. emarginata*



One foot above the 22nd step  
 was found a 6" band of  
 calcareous-mammalian rock with  
*S. pinnatus*  
*A. bonata*  
*E. punctata*  
*P. rana*  
*E. granulosa*  
*C. truncata*  
*C. thorensis* sp.

*C. rana*  
*P. rana*  
*E. punctata*  
*S. pinnatus*  
*E. granulosa*  
*C. truncata*  
*C. thorensis* sp.

This stone also contains small  
 black concretions.

Above this hard layer at  
 23 the rock is shaly and blue but  
 below the hard band it has

*S. pinnatus*  
*P. lanceolata*  
*C. recurva*  
*M. pygmaea*

*S. pinnatus*  
*M. pygmaea*  
*P. rana*  
*C. rana*  
*Cyclodictya* sp.

23-24

*Pal. communica*  
*S. pinnatus*  
*P. rana*  
*M. trigueta*  
*S. crataegus*  
*M. varicosa*  
*P. arcuata*  
*S. aristatus*

*M. varicosa*  
*M. ligata*  
*Pal. truncata*  
*P. rana*  
*A. rana*  
*M. pygmaea*  
*Pal. truncata*  
*P. rana*

24-25 - Limestone

~~24-25~~

At 26+7 comes a 3" band of  
 hard rock with a prominent  
 this is like the rock at Fisher's  
 Falls. Below this stone there is



about 4' of rock with *T. canalicatus*,  
*S. pennatus*, *Cyrtostrophia*, *S. costata*,  
*Platyceras* sp., *T. canalicatus*,  
*S. substriatus*, *Pal. concentrica*, *P. saevus*.

At 27 very soft shales of dark color  
 have - *T. Penna*, *S. tullius*, *R. salmou-*  
*ona*, *R. dedia*, *S. pennatus*. The *S. tullius*  
 at this level are all of small size.  
 This is the same sequence as seen  
 at Timbers Falls. The hard band  
 below with *Canella* and *Echinosuccis*  
 must belong to the first rock  
 that I noted at Timbers.

At 28 in rather dark shales  
 having a few concretions the  
 following fossils were seen  
*Pholidops hamiltoniae*

<i>N. varicosa</i>	<i>Lox. hamiltoniae</i>
<i>Pal. concentrica</i>	<i>N. bilobatus</i>
<i>R. vancouveri</i>	<i>R. spiniferoides</i>
<i>Scaphites</i>	<i>S. pennatus</i>
small sp.	<i>Crinoid</i>
<i>N. pygmaea</i>	<i>N. lirata</i>

These are probably representative  
 of Clatsop Lagoon Transition  
 zone.

28-29 - a small exposure in the  
 middle of this is a light yellow  
*P. canalicatus* & *Pholidops*

29-34 - *lirata*

1' above 34 is a dark ls. band  
 6" thick forming a cascade. It  
 contains:



*C. scitulus*, *I. carinatus* c., *S. marginatus*,  
*stretatus*, *C. sinuatus*, *S. pinnatus*,  
*Supraplana*, *I. pinnatus*, *I. carinatus*.

Below this ls. there are 3' of coarse, granular fossiliferous shale.  
*I. pinnatus*, *C. sinuatus*, *S. scitulus*.

On the ls. come gaily blue gray shales with *I. pinnatus*, *C. scitulus*, *I. carinatus*, *P. nodosostatus*, *C. scitulus*, *H. oblongatus*, *H. triquetus*, *O. pinnula*, *H. bellistatus*. The shale is rather hard.

About 2' below 35 steps come much softer shale. The hard calcareous zone is about a foot thick including the shaly beds noted in the paragraph above.

On the shales with columns found are:

*I. carinatus*.

*S. pinnatus*.

*H. bellistatus*.

The shales are sandy, thin bedded with shale partings between.

These sandy shales end at about 35 steps. Between 36 & 37 a small exposure of very dark argillaceous soft shales holds *L. laevis* in abundance. Also specimens of *C. scitulus*. The shales are black, in places, rusted to a red brown as noted in the black shales at Jinkens.

37-38 - shales

38-39 - more black shales with *H. oblongatus*. The shales are rather hard here. *I. carinatus*, *H. corbuliformis*, *C. scitulus*, *P. emarginata*, *H. bellistatus*.

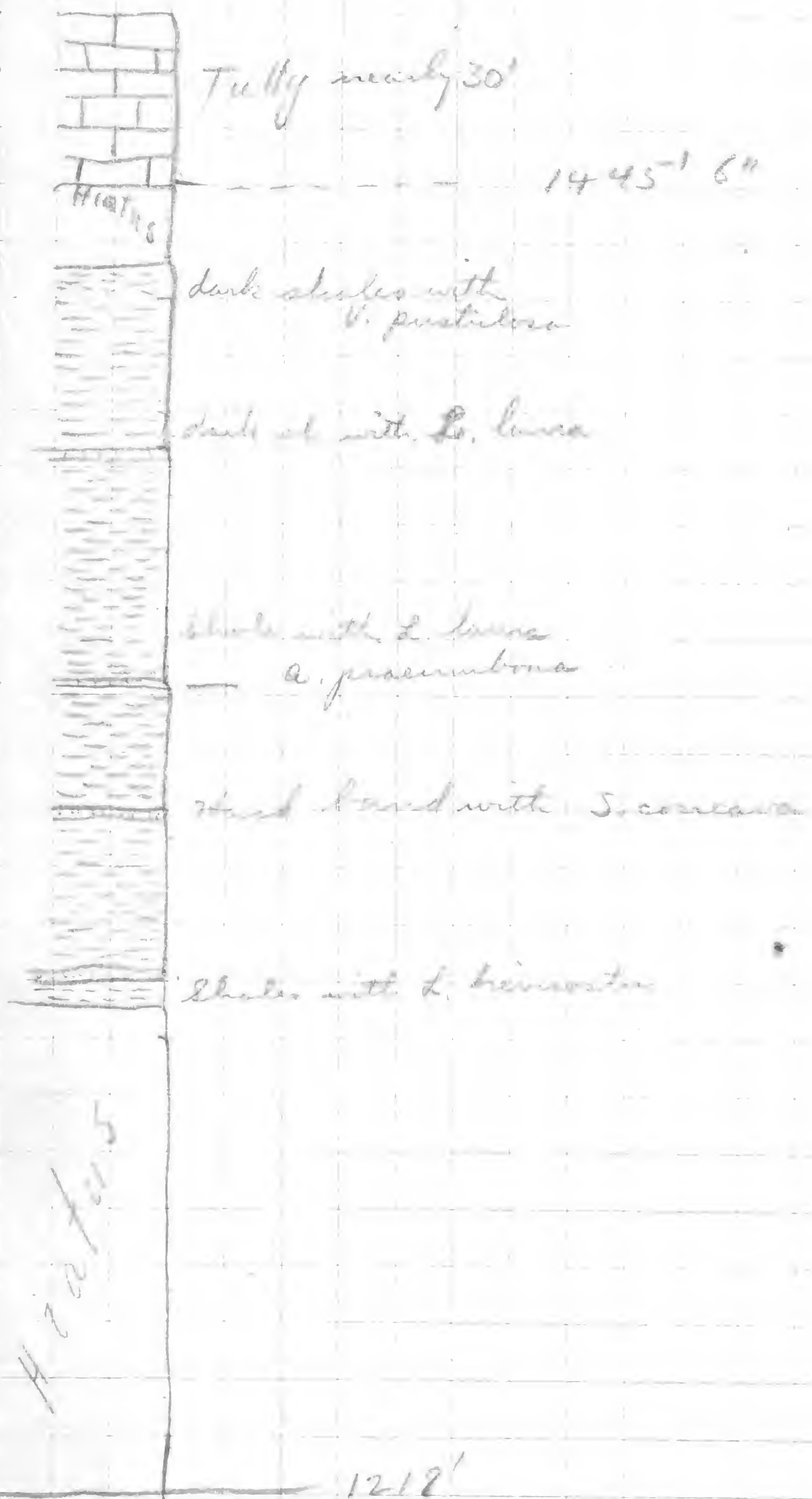


At the top of 39. *S. bellus*,  
*E. ...*, *... large ...*, *...*  
*... ..*, *... ..*, *... ..*  
*M. ...*, *R. ...*, *R. ...*  
*C. ...*, *... ..*

39-40 - Light blue very shiny  
 thin strata. In contact with



Kavine at Keeney





# Clarke's Ravine - north of Keency

In a ravine a short distance north at 214 paces was found a hard conglomerate calcareous band but it did not yield fossils as it was poorly exposed. At 320 paces about 10' of shales was exposed these are gray in the interior & blue-gray on the surface with deep beds which it breaks rather readily. Fossils are -

*A. carbonata*

*A. plana*

*A. capillaria*

*A. scutellata*

*A. pectinata*

*A. coronata*

*A. plana*

*A. capillaria*

*A. scutellata*

*A. pectinata*

*A. coronata*

*A. coronata*

From 424 paces to 435 paces same as above in stream bed

at 500 paces same as above.  
at 555 the crinoid branches & show rock at the base -

*E. bellistata*

*E. coronata*

About 10' above this ~~base~~ (565) *Planorbis* is very abundant but above this the SE of the ravine is filled with debris and obscures all rock.

10' above the 565 paces are dark shales

At 445' above 555 was found sand containing the concentration



Clarke's Ravine north of Keeney

Sept. 5.  
Handlevelling begun at 1215'

Below 6 + 7 steps up comes about  
9" of hard sandy shale grey-blue in  
color and calcareous. It has an  
undeven fracture. Fossils:-

*C. scutellus* a

*G. spiniferoides*

*S. pinnatus*

*R. vanuxemi*

*C. bellistriata*

*M. bellistriata*

At 11 steps comes blue grey rather fine  
shale with *A. undulata* (see fossil  
list on previous page).

At 14 these blue grey shales are  
exposed on the stream bed.

At 15 the stream divides and here  
there is a good exposure of blue grey  
shale. These contain between 20 + 22-

*G. undulata* c

*C. boothi*

*P. marginata*

*J. carinatus*

*S. pinnatus*

*P. rana*

*P. concentrica*

*C. bellistriata*

*C. mucronatus*

*A. seticularis*

*M. bellistriata*

*M. corbulariformis*

*M. oblongatus*

*S. arctostriatus*

*M. trigonatus*

*Lox. hamiltoniana*

*C. scutellus*

*O. carinata* or

*M. pygmaea*

*Par. hamiltoniana*

*Tr. pinnatus*

*O. parvula*

At 24<sup>th</sup> comes a fall and this has  
up to 25' *A. undulata*.

At 25-26 come

*G. finitima*

*S. pinnatus*

*C. scutellus*

*A. spiniferoides*

*C. undulata*

*M. concentrica*

*R. vanuxemi*

*S. pinnatus*

*C. bellistriata*







29-30 - soft shales. Blue gray, getting  
shales with  
P. radiata  
H. p. ...  
H. caput ...  
D. ...  
E. ...  
Pal. ...

30-31 -

H. ...  
Pal. ...  
H. ...  
D. ...  
E. ...  
Pal. ...

31-32 - The ...  
hard ...  
The ...  
no ...

32-33 - hard ...  
The ...  
The ...

The ...  
The ...  
The ...

33-34 - ...



35-37 - liates.

About the last 2' of 37-38 are dark gray shaly liates to light gray. These are slightly finer and stiffer than those below.

*S. pennatus* cc.

*L. scutellus*.

*E. parvata*

*Platysma* sp.

*Proclitella* sp.

The *S. pennatus* are very long winged.

~~38~~ 38-52 - liates and at the top of 52 comes the Tully, a thin layer of which is about 2' to 3' thick.

The Tully is at about 1502 ft. The same divides at the base of the Tully.

These figures above on the Tully are probably wrong; it should be somewhere about 1450'. I must have made a mistake in the hand-leveling. The levelling was carried up to 38 O.K. but was lost here. At least 7 steps exist up to the Tully but probably more also. The elevation of the Tully must be around 1467-1482.







June 15 (7)

O'Dell's Quarry

Quarry 25' high N 17 E of Erieville.  
This quarry shows a section similar  
to that of 15-6 but is higher up.  
At the base is a hard grey arenaceous  
shale, becoming softer & bluer for  
a short interval (2'-3') then hard  
again. This interval contains *S. pennatus*,  
*C. coronatus*, *C. scitulus*, *C. mucronatus*,  
*T. carinatus*.

6' above base is a calcareous band  
(lens) with many *Strophodontes* and  
*S. pennatus*.

The arenaceous shales are hard  
and measure up to 12' above the  
base. Where there is again a  
shell band about 4" thick.  
This band contains large *Strophodontes*.

The shale above the ls. band  
is softer and contains many fossils.

<i>Crinoid elongata</i>	<i>M. concentrica</i>
<i>S. pennatus</i>	<i>C. bellistriata</i>
<i>T. carinatus</i>	<i>M. mystiloides</i>
<i>P. cycloides</i>	<i>C. boothii</i>
<i>S. planus</i>	<i>P. latus</i>
<i>P. flabellum</i>	<i>C. coronatus</i>
<i>S. granulatus</i>	<i>M. bellistriata</i>
<i>P. discoidium</i>	<i>P. concentrica</i>
<i>O. carinata</i>	<i>S. solenoides</i>
<i>S. hamiltonensis</i>	

Incised-like growths were noted in  
the lower rock, called by O'Dell a blue  
lime.



225 1927  
Road nr. Sheds

225

Sept. 6.

Between 257 & 26 paces up road were  
found shales and coarse sandy shales,  
which in the lower portion for about  
2 ft is a soft olive colored shale because  
of weathering. This soft shale contains  
*G. constriata* *T. submarginata*  
*Leda sp. (cf. ducina)* *C. boethi*  
*S. pennatus* *N. triquetra*  
*O. carinata* *M. pygmaea*  
*Pal. concentrica* *J. p. patulus* *C. setulus*  
*P. rana* *H. oblongatus*  
Small pitted pyrite concretions



sandy sh 1 1/2'

soft gully sh 1'

On the soft shales comes  
rather abruptly, coarser  
shales breaking into  
thick irregular slabs.  
This horizon contains  
*J. carinatus* *C. S. granulosa*  
*H. lincta* *C. imicola*  
*Pal. concentrica* *O. theca*  
*S. obsoleta* *R. vancouveri*

Each square 1'

*C. coronatus*

Some of this stone where fresh is  
blue gray and appears argillaceous. It  
weathers to a brown sandy rock.

*S. perplana* *C. micromatus*  
*H. debyi* *P. spinulicosta*  
*A. erectum* *B. fofoa*  
*Par. hammondi* *P. p. randa*  
*N. bellistriata* *P. discoidum*  
*P. emarginata*

*Cambr. trilobite* of pplo

Top of hard band is at 26.



26-27 Blue gray gritty shales like those at Edinville breaking into large fragments

27-28 - Same with *S. perplana*, *S. circularis*, *T. carinatus*, *R. vanuxemi*, *C. mucronatus*

at 28 is a thin sandstone band.

28-29 - *Sperplana* cc, *R. vanuxemi*, *T. carinatus*, *S. granulosa*, *Aulopora*, *P. discordans*, *C. boothi*, *C. stemmistrata*, *S. pennatus* a foot below 29.

At 29 the rock is harder and appears calcareous. Here fossils are very numerous: - *C. mucronatus* cc, *T. carinatus*, *R. vanuxemi*, *S. pennatus*,

29-30 - *S. granulosa*, *P. patulus*, *R. vanuxemi*. In the middle of this interval the rocks are hard and calcareous.

30-31 - On top of the somewhat calcareous rocks between 29 and 30 are found blue gray fossiliferous shales that contain

*A. decussata*

*S. perplana*

*C. mucronatus*

*H. triquetra*

*P. salina* c

*R. vanuxemi*

*S. pennatus*

*M. pygmaea*

*Pal. concentrica*

*Par. hamiltoni*

*Lox. laus.*

*Lepteria* sp.

*A. serpens*

*P. anguina*

*A. umbonata*

*C. indenta*

*C. boothi*

*M. mytiloides*

*C. bellistriata*

*N. oblongatus*

*Spirifer*

*P. nuda*

*S. crotalum*



This layer seems to have a more varied fauna than those below.

*P. radiata* *S. rugosa* *Orbiculoidea* sp.  
*A. reticularis* *Pholidops* hem.  
*P. lanceolata* *S. arcuata*  
*C. sappho* *S. carinata*  
 Disarticulated *P. rana* are very common

30-37 — *P. oviformis* *S. chenuensis*  
*Cystodictya*  
*O. carinata*  
*C. corrugata*  
*R. fimbriata*

Above 31, about 12' of these shales are exposed.

Between 33 + 34 —

Same shales with *I. carinatus*  
*S. pinnatus*, *R. fimbriata*, *E. lincklaeni*  
*S. granulosa*, *A. reticularis*. These shales also exist about 10' above step 34. in a small bank exposure. They seem less fossiliferous. *S. crotatum*  
*C. mucronatus*, *I. carinatus*, *M. pygmaea*  
*Orthoceras* sp., *Lophonema* sp., *N. varicosus*  
*N. bellistriata*

Between 35 + 38 — hiatus

At 38 a small exposure of the same rock with abundance of *S. pinnatus* was seen.



● From 1635' 170" to 1645' 180" - in a side  
branch going east - *lunatus*  
1645' 180" - 1650' 185" - soft blue gray  
gritty shales, *M. tugeti*, *P. rana*, *C.*  
*S. cristatum*, *S. granulosa*, *S. pinnatus*,  
*M. nyctiloides*, *A. spiniferoides*,  
*M. concentrica*,

# 1650' 185" - 1655' 190" - *S. pinnatus*,  
*J. carinatus*

Sept. 6.

West of Eagleville on top of Hill west of  
Eaton - Morrisville road - sandstones,  
slabby, rather coarse, with concretion  
pockets. *P. flabellum*, *S. carinatus*, *Camartoechia*  
These probably belong to the Fertland  
Stock Farm horizon



Sept 28

Road to Linsden Hill

Hand climbing down at 1570' A.T. at  
R.R. track at Greenville Station1570' - 1600' 30" - lighter. At 1600' 30"  
some arenaceous shales with  
*S. pennatus*, *P. flabellus*, *P. lanceolatus*,  
*I. pennatus*, *E. spiniferus*, *I. acutus*  
The latter 2 exposed but

1600' 30" - 1605' 35" - lighter

1605' 35" - 1615' 40" - coarse arenaceous  
shales with *I. acutus* & *I. pennatus*,

1615' 40" - 1625' 55" - lighter

1625' 55" - 1630' 10" - 3' of softish  
blue gray shales in the middle of the  
interval. *I. pennatus*, *I. acutus*, &  
At the top of the interval are hard  
arenaceous shales with  
*I. pennatus* *C. large strophodonta*  
*I. acutus* *C. bellistata*  
*C. scitulus*1630' 60" - 1635' 35" - some *I.*  
*pennatus*, *I. lanceolatus*,The arenaceous shales here  
weather to a purple exterior.  
These exposures were much too  
covered & patchy to be worth  
anything.







Genesee ss. 1750' A.T. Tully  
shale 1750' A.T. Tully

Tully ls. 1648

Near head of Otsego Creek. The ls. is found at the foot of the ravine with a few inches of Muscovite below. The thickness is 16' 3" with a foot of ls. that is transitional between the Tully & the Genesee. The bed contains about 15 layers, the bottom one of which is the thickest about 1 1/2". About 5' from the top a very fossiliferous bed was seen, the same as that in the other Tully localities. There are also shale bands, particularly above & below the fossiliferous (Platyceras) band noted.

The Genesee extends for at least 50' above the Tully. At about 57' above the Tully a thick ss. band comes in and below it about a foot of thin ss. This probably marks the end of the Genesee, for all the shale noted above, to about 98' above the Tully was not black, but rather olive. This shale was interbedded with thick layers of ss. sometimes the ss. layers were divided by intercalated beds of thin ss.

Tully 16' 3" The Tully is at 1648' A.T.

Genesee - 57' + 1' transition ls.

Sherburne - 7'

Many ss. slabs in the stream bed have a curved plane.



232

232

## Muller Hill

cl. thaca?

53' below house on top of hill 13' of rock  
grey ss & shaley ss. with a few fossils  
exposed in the road where it has been  
cut. Wood was not uncommon.  
The rock breaks up into small pieces.



12/25  
12/25

8791  
6951  
1840







There is about 9' of this shale exposed above the bridge, the top being about 18' above the level of the bridge.

Fossils in shale above 18'—

*A. granulosa*

*T. cuneatus*

*R. vancouveri*

*S. hamiltonensis*

*C. luc. scitulus*

*P. rana*

*D. sculptus*

*S. pinnatus* small corals

*L. rogersi*

*Lept. cheungensis*

*A. spiniferoides*

*A. reticularis*

*P. costata*

*D. inaequata*

About 63' above the bridge comes a hard sandy layer about 6' thick forming a fall. This contains:—

*S. pinnatus* c

*L. pinnata* c

*A. spiniferoides*

*Cyrt. linn.*

*M. conium*

*A. granulosa* c

*S. pinnatus*

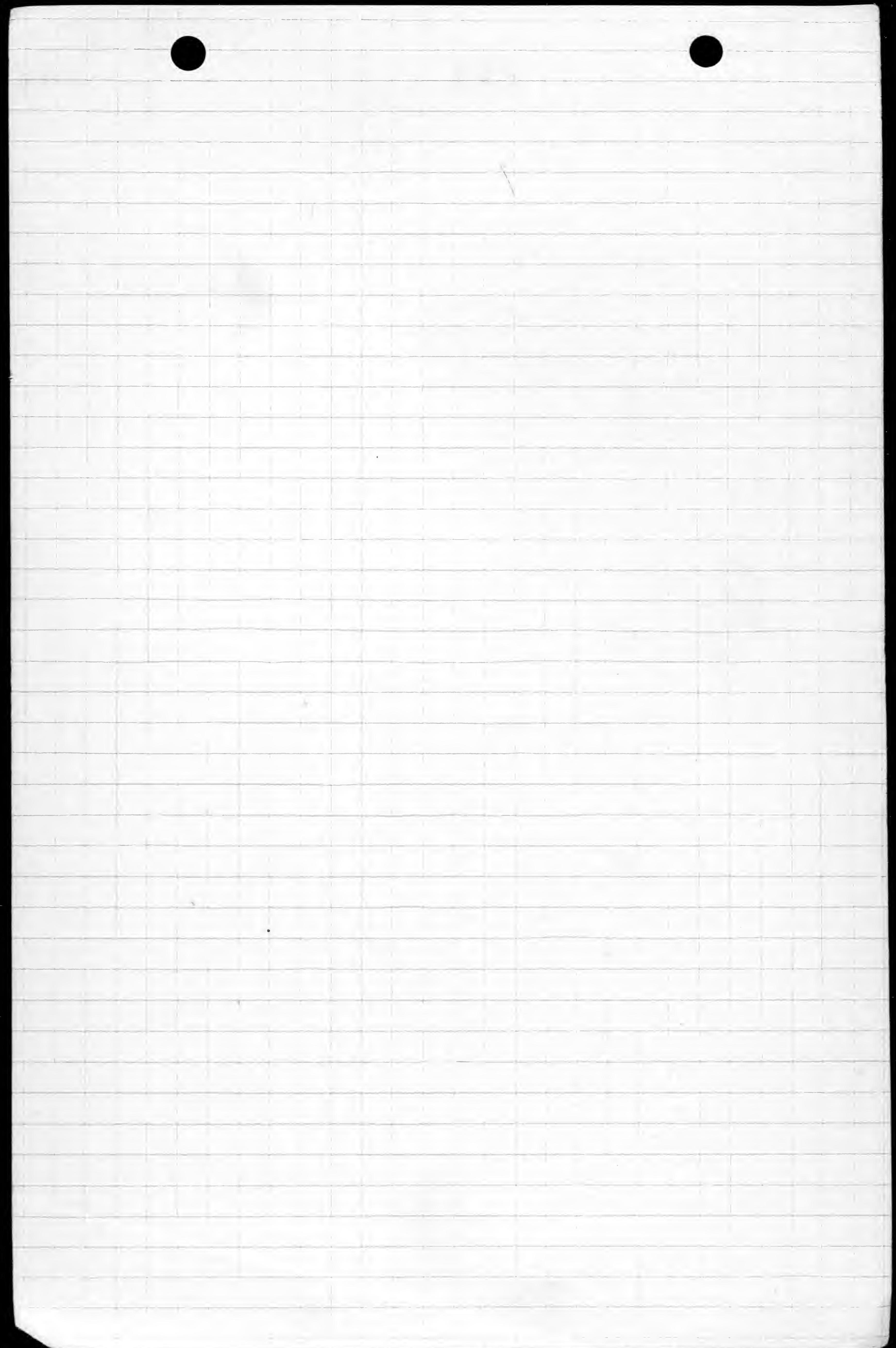
*P. costatus*

*A. reticularis* (large)

A thin layer of crinoid stone occurs about

1' below the bed carrying *D. sculptus* but above it is about 1' sandstone. I believe the Ludlowville-Spruett contact is at about 1348' above sea-level.







Cay Quad.

Sept 8.

Exposure on Roadside

Hand drilling begun at 1015' AT.

1015' - 1035' 20" - covered - at H.C. top is about 2' of  
~~arenaceous shale~~arenaceous rock abounding in a bryolite.  
2' above the top of this interval comes a  
bed of corals, mostly <sup>3-4 ft</sup> Zaphrentis, in the  
sandy shale. This is probably at the  
same horizon as the corals at Delfi.  
These are in the Delfi member.1035' 20" - 1040' 25" - 1045' 30" - thin in the  
arenaceous shale

A. bryolite

P. laticosta

M. subulata

A. spinifera

M. mytiloides, c

A. affinis

M. alta

M. angusta

Z. aculeata

S. obsoleta

C. aculeata

C. mucronatus

P. flabellum

S. costatum

P. pinnulata, c

P. sulcimanicata

L. marginata

L. pinnata

A. glandulosa

M. concentrica

O. loricata



$$\begin{array}{r} 1848 \\ 1157 \\ \hline 191 \end{array}$$

$$\begin{array}{r} 1848 \\ 1157 \\ \hline 191 \end{array}$$



## Erieville

June 18<sup>th</sup>

The first appearance of bed rock in stream is at about 1530'. The first rock encountered is a blue shale on exposure but quite black when fractured.

✓ *P. plana*  
 ✓ *S. submarginata* c  
 ✓ *N. biata*  
 ✓ *O. parvula*  
*C. brachi*  
*Conostecchia* sp.  
*Bryozoa*  
*Ab. lenticularis*  
*Spinifer* sp. c.  
 ✓ *S. pinnatus*  
 ✓ *C. scitulus* cc  
*Trigula* sp.  
 ✓ *H. bisulcata*  
 ✓ *H. arcuata*  
 ✓ *S. chevronensis*  
*H. capillaris*

✓ *N. bellistriata*

Ostracod

✓ *A. umbonata* 1540'✓ *N. oblongatus*✓ *N. trepostoma*Foss. *Lamellariae*✓ *Craniella* lam.✓ *O. carinata*✓ *O. undulata*✓ *P. concentrica*✓ *A. erectum*✓ *P. tenuistriata* ?✓ *M. concentrica*✓ *P. flabellum* (small)✓ *A. cf. pinnatus*

This fauna may place these shales at about the same horizon as the blue shales at the Erieville railroad cut. At 1540' about 6' vertically of the bluish shales are exposed.

At 1537' hard sandstone is encountered that breaks into blocks & joints here toward N32E. The blocky ss. is only temporary in the sequence for about 2'. Above it there are hard shales one surface of which is distinctly ripple-marked. These hard shales break into flat slabs. A complete *Hemalostoma* *dehorgi* was found at about 1539'. A *Cr. brachi* & *Cr. brachi* & *Cr. brachi*.



18'	1677	Blue shales	1678
	1659	with abundant fossils	
	1648	30' + sandy sh.	
16'	1626 1/2	Shales with 2 p. ...	52' - 56'
	1625	hard sandstone	
		Blue shales with 2 p. ... and L. ...	
	1590	soft sh. with L. ...	62'
	1584	hard sandstone	
	1582		
	1580		
	1574	at top ...	17'
	1567	hard sandstone	
		limestone	22'
	1545	Blue shale upper layers	15'
	1538	very fossiliferous	



Stems were also found at this horizon

At 1582' occur a few inches or 9' of soft shale with many fossils

*L. laura*

*Strophodonts cf. dentata*

*S. pennatus*

*Camantoechia* sp.

*C. mucronatus*

*Orthoceras* cf. *tebryi*?

*Rhipidocella* *canis*

*Spirifer* sp.

On this layer of soft shale is a 1 1/2' - 2' band of hard resistant sandstone which is capped by about 6' of soft shale with

*L. laura* cc.

*C. elongata*

*Strophodonts* cf. *dentata*

*Grammysia* sp.

*P. marginata*

*M. concinna*?

*N. triquetra*

*Camantoechia* sp.

*I. submarginata*

~~*G. laura*~~

These shales are like the thin band below. At 1591' these shales are less fossiliferous but contain

*Camantoechia* sp. Excellent ripple marks were noted at 1592' On

cross-section they would appear with a steep slope <sup>on west</sup> side, that to the

as they trend N 74 W. They measure about 3" from crest-to-crest. The troughs

are shallow. Joint here are N 16 E and about 24' apart. At 1595' *M. elongata*

was noted. *L. laura* at 1597' at 1602

*S. pennatus*, *Camantoechia*, *M. concinna*

Between 1602 & 1607 the shales are quite fossiliferous with

*S. pennatus* cc.

*Camantoechia*

*A. untrona*

*Grammysia*

*M. concinna*?

*M. northensis*



*L. laura* *S. perplana*  
 At ~~1607~~<sup>1613</sup>' the same kind of shales  
 are still present.

At 1618' were found *H. triquetra*, a  
 large *Cammarotoechia*, *C. congregata*,

At 1625' is a 1' band of hard blue  
 sandstone that makes a cascade  
 in the stream.

From 1625' - 1636' on top of the ss band  
 are blue shales with *L. laura* & *S.*  
*pennatus*.

1643 same, but appear harder,  
 here they have been sunbaked & are  
 grey.

In the interval between 1643 and 1654'  
 the rock has become hard and sandy,  
 forming a sandstone. This ss has  
 large p. pebbles, probably granular,  
 and occasionally a large round  
 concretion.

At about 1660' blue shale again  
 with *S. pennatus*, *Strophodontes*, *P.*  
*carinatus*, *S. granulosa*, *P. concinna*,  
*A. spirocoides*, *P. concentrica*.

*S. pennatus* is abundant at 1664.  
 1664 - 1669' - *H. oblongata*, *S. pennatus*,  
*P. radiata*, *P. carinatus*, *C. brachy*,  
*S. perplana*, *P. undulata*.

The shales at this level resemble  
 very closely those at Georgetown in  
 the Brook where I have collected  
 many specimens.



Sept. 30

Passing near Encino

Kind's cutting begins at about 1560' AT.

Gravelly sandstone common at 1570' AT.

1570' 10" - 1575' 10" - Blue gray shale

*U. subcarinata*

*U. linearis*

*M. subulata*

*S. submarginatus*

*Conarotrichia* sp.

*P. linearis*

1575' 15" - 1580' 20" - same

At the top the following were seen

*U. subcarinata*

*U. linearis*

*M. subulata*

*P. flabellum*

*U. linearis*

*U. varians*

*C. boothi*

*O. undulata*

1580' 20" - 1585' 25" - shales - blue gray

massive - like those at Encino

*U. subcarinata*

*U. undulata*

*S. pinnatus*

*M. triquetra*

*P. foliolaria*

Fossils are not very abundant but the variety is large.

1585' 25" - 1595' 35" - limestone

1595' 35" - At top of this step shaly sandstones for about 3'.

1595' 35" - 1600' 40" - same with

*Conarotrichia*. A *C. linearis*?



The stone here is rather soft & is  
apple marked in one place &  
there is a lot of the sandstone  
breaks up into rather thin  
irregular slabs.

1600' 40" - 1615' 40" - about 2' of ss.  
that breaks into irregular slabs and  
almost devoid of fossils. The only  
fossils noted here were small  
bryozoan colonies.

1615' 45" - 1618' 00" - fine ss & sandy  
shales.

1618' 00" - 1618' 55" - P. emarginatus,  
P. flabellum, P. verrucosus, C. emarginatus,  
P. maximus, P. tenuistriatus, P. serratus,  
L. lunata, Spizfars. About 1' above  
this layer there is a 6" hard  
layer of ss. and above this  
3' of the grey arenaceous shale.

S. densus	H. princeps
P. spiniferus	C. lunata
P. flabellum	H. oblongatus
P. regularis	H. triangularis
P. costatus	L. lunata

1618' 55" - 1620' 60" - same sandy  
green grey shales capped with  
harder apple marked sandy  
shales. The only fossil found  
in this upper part was  
P. tenuistriatus & C. emarginatus.



1640' 80" — 1645' 85" — same strata  
Coarse-ribbed *Camarotoechia*  
*S. ponderosa* etc. *Paralichthys* *diversa*  
*P. bellum* *E. bisulcata*  
*C. bellistricata*

1675'85" — 1650'90" — Large Campanulaceae  
Citharus sp., *Tranversaria oblonga*  
in blue-grey sandy sh. & limestone  
a foot below the top of the  
interval as a 9" band of hard  
limestone.



1655' 95" - 1660' 100" - shales becoming  
coarser

1660' 100" - 1665' 105" - very argillaceous  
sh or fine ss.

1665' 105" - 1675' 115" - mostly shaly  
or on very coarse sandy sh.  
continuing up to 1675' 115" then brown  
shales finally become rather  
soft like gray ls.

The soft shales go up for  
L. penicillatus, L. caudatus.



Ravine near Road, between  
Sheds + New Woodstock. 1445

About 1455-1465 - Rather soft somewhat, gummy  
shales in the stream bed. They are blue grey  
to olive according to the degree of  
weathering.

*S. fissurata*

*P. radiata*

*S. pennatus*

*T. bellulus*

*C. scitulus* c

*O. undulata*

*N. oblongatus*

*T. carinatus*

*C. bellistriata*

The *S. pennatus* are very large, numerous  
and relatively long. The *T. carinatus* is  
transverse.

At about 1463 the rock is a hard  
sandy shale that breaks in the top  
bed into large, thick slabs.

Fossils here are

*L. aspidium*

*T. carinatus*

*S. lirata*

*S. pennatus*

*A. princeps*

*C. scitulus*

*N. bellistriata*

*S. perversa*

*S. acuta*

*S. lirata*

The rocks on the surface are brown but  
dark blue grey within.

1465'5" - 1470'5" *T. carinatus*, *P. communis* c  
*S. granulosa*, *S. pennatus*, *C. bellistriata* c  
*P. spinulicosta*, *Cystodictya*, *Favosites*  
in a sandy shale rock.

2' above 1470'5" - covers the top of  
of a 2' layer of rock like that below  
with *T. carinatus* a, *Cystodictya*, The top  
is capped by a calcareous rock  
with the same fossils. and



*[Faint, illegible handwriting on lined paper]*



*C. bellistriata*, *P. rana*, *P. emarginata*

1470'5" - 1475'10" - Softer dark-blue grey shales abounding in *S. pinnatus*<sup>a</sup>, *B. bella*, *G. carinata*, *A. erectum*, *J. carinatus*, *c*, *Pteronotus* sp, *G. bruleata*, *H. corbulariformis*, *Pholadella parallelus*? *Fingula* sp, *P. radiata*. These shales are softer and break into small chips.

1475'10" - 1480'15" - Lutes

1480'15" - 1485'20" - Very soft dark <sup>blue grey</sup> shales gritty with: - *P. radiata*, *S. pinnatus* a, *Goniatites* sp, *Grammysia* sp,

1485'20" - 1490'25" - The shales here have weathered to very small chips: -

*C. mucronatus* a, *C. scutulus*, *S. pinnatus*, *M. pygmaea*,

These shales by the time 1490'25" is reached have become rather argillaceous the grit having quite disappeared.

Collecting is difficult here as the shales break into very small fragments -

*S. perplana* small, *P. emarginata*, *C. boothi*, *P. rana*, *S. granulatus*, *H. bellistriata*, *Lox. hum.*, *H. lirata*, *S. pinnatus*, *C. scutulus*, *A. umbonata*, *C. tenuicinctus*, *C. coronatus*, *P. radiata*, *H. triquetra*, *Cran. hamiltoniae*, *S. minutum*, *Pal. concentrica*,

1490'25" - 1495'30" - *H. delagei*, *C. boothi*

var *calitales*, *C. mucronatus*, Occasional small calcareous oval concretions *A. umbonata* c, *C. scutulus* c, *C. bellistriata*, *H. capillaria*



The rock in the stream bed breaks into larger pieces than the rock below. The shale here is dark blue grey.

1495'30" - 1500'35" - same shale.

*Pal. concentrica*, *S. lirata*, (*C. mucronatus* cc., *C. scitulus*, *A. umbonata* and *Spermaturus* are all abundant. The rock in the Creek bed breaks into larger rather irregular slabs but where it has been exposed it crumbles into small chips. The stream here follows a gully cut between two joint planes.)

1500'35" - 1505'40" - *P. rana*, same as below.

1505'40" - 1510'45" - same

1510'45" - 1515'50" - "

shales a little more compact  
1515'50" - 1520'55" - *C. scitulus*, *A. umbonata*, *S. granulatus*, *S. pennatus*, *Par. hamiltoniae*, *C. coronatus*, *Pal. concentrica*, *C. mucronatus*, *P. cylindrica*, *N. bellistriata*, *S. arcuata*, *Amiophora* sp.)

1520'55" - 1525'60" - same shale - *Pradiata*, *Pal. femida*, *C. scitulus*, *M. pygmaea*, *P. discoides*, *N. Bellistriata*.

1525'60" - 1530'65" - *C. bellistriata*, cc.

*T. carinatus*, *S. pennatus*, *P. rana*

*Lupstera* sp., *C. coronatus*. These shales are hard and dark grey



1530'65" - 1535'70" - *C. bellistriata*  
*S. solenoides*, *Lewipteria*, *H. bellistriata*  
*C. coronatus*, *Par. hamiltoniae*, *T. carinatus*  
*S. pinnatus*, *A. umbonata*, *Pal. concentrica*,  
*P. rana*,

1535'70" - 1540'75" - a calcareous lens  
 exists at 1535'70" but is of small extent  
*Wood. P. discoides*, *A. umbonata*, *P. rana*,  
*C. bellistriata*, In the lithology and  
 fossil character here the rock has  
 the look of the Moscow. The rock  
 is a soft dark gritty shale,  
 with considerable iron rust on the  
 surface. *A. umbonata* is abundant  
 here. *M. concentrica*, *G. arcuata*.

1540'75" - 1545'80" - at the top of this  
 interval fossils are abundant  
*S. granulatus*, *R. vanuxemi*, *A. decussata*  
*M. concentrica*,

1545'80" - 1550'85" - same shale

1550'85" - 1555'90" same

1555'90" - 1560'95" - *S. perversa*, large, *C. mucronatus*  
*C. bellistriata*, *B. ellipticus*, *T. carinatus*,  
*M. concentrica*, *C. coronatus*, *S. pinnatus*,  
*Par. hamiltoniae*, *R. vanuxemi*, *A. reticularis*,  
*M. nutiloides*, These rocks also have  
 the look of those at Georgetown  
*S. granulatus*

1560'95" - 1565'100" - At the top of this  
 interval is a hard band 8" thick  
 that forms a fall. It has



*H. delavayi* *S. inaequistrata*  
*S. granulosa* *C. coronatus*  
 ● It is very hard blue-gray calcareous  
 rock.

1565' 100" - 1570' 105" - *H. lirata*, *S. pinnatus*,  
*H. oblongatus*, in the shales between the  
 two hard bands as another is about  
 14' above that at 1575' 100".

1570' 105" - 1575' 110" - *C. scutellus*, *H. triguter*,  
*S. pinnatus*, *A. undulata*, *H. bisulcata*  
 1575' 110" - 1580' 115" - 3' above 1575' 110" comes  
 a hard layer of calcareo-arenaceous  
 matter with *H. carinatus*, *Prodentella*,  
*S. perplana*, *C. coronatus*, *S. pinnatus*,  
*S. granulosa*, this band is about  
 9" thick. Above it are rather soft  
 blue gray shales.

1580' 115" - 1585' ~~120"~~<sup>125"</sup> - *H. lirata*, *S. pinnatus*,  
*S. acuta*, the rocks are not very  
 fossiliferous.

1585' 120" - 1590' 125" - a cascade over  
 rocks that are rather hard, calcareous  
 and sandy, forming a cascade,  
*H. carinatus*, *S. perplana*,

1590' 125" - 1595' 130" - *H. carinatus*, *C. coronatus*,  
*H. oblongatus*, *S. pinnatus*. The rocks break  
 into large slabs here.

● 1595' 130" - 1600' 135" - *S. pinnatus*,  
*H. carinatus*, At 1600' 135" the rock  
 is very hard calcareo-arenaceous  
 with *H. granulosa*, *S. pinnatus*,  
 3" thick. Small aggregations of shell



shells, also occur.

1600' 135" - 1605' 140" - softer shales with a purple weathering.

*C. constricta*, *S. pinnatus*, *C. mucronatus*  
4' of shale mounted by 4' of hard calcareous stone.

1605' 140" - 1610' 145" - liatus.

1610' 145" - 1615' 150" - blue-grey shales with abundance of *S. pinnatus*, *P. rana*, *Cyst. lani*, *Camacotachia*, *O. constricta*, *P. constrictus*, *C. scitulus*, *R. pinnatus*, *Pholidops*. These shales are like those at 1600'.

1615' 150" - 1620' 155" - same. *Aviculopora*, *S. pinnatus*, *S. crocatus*, *P. rana*, *A. reticulatus*, *P. rana*, *P. discoidalis*, *M. pygmaea*, *S. perplana*.

1620' 155" - 1625' 160" - at 1 1/2' below -

1625' 160" - 3" band of calcareo-arenaceous stone. A foot above this is a thin layer of calcareous rock with *Terebratulids*. It is 1 1/2" thick. Below it is about 1" of shale. This layer has *T. laura*, *C. scitulus*, *A. spiriferoides*.

1625' 160" - 1635' 170" - shales breaking into large pieces.

1635' 170" - 1640' 175" - same above - colored from weathering.

1640' 175" - 1645' 180" - Blue grey coarse hard shales.



1645' 180" - 1650' 185" - *M. mytiloides*,  
Fossils are rare.

1650' 185" - 1655' 190" - same

1655' 190" - 1660' 195" - *J. carinatus*,  
*S. pennatus*, *Taorminus*.

At top of 1660' 195" is a 3" layer of  
blue grey ls. with *J. carinatus*, *A. coral*  
was seen in the arenaceous rocks  
below it. Most of these rocks are  
calcareo-arenaceous in this  
interval.

1660' 195" - 1665' 200" - Hard sandy sh.  
rock *J. carinatus*. The top rock at  
1665' 200" has *R. vanuxemi* C,  
*S. pennatus*, *J. carinatus*, *C. mucronatus*,  
*A. serpens*, *C. bellistota*, This was  
hard calcareo-arenaceous rock.

1665' 200" - 1680' 215" - hiatus

1680' 215" - 1685' 220" - soft very dark  
blue grey rusty shales. *A. spinifera* sp.

1685' 220" - 1720' 255" - hiatus - stream ends.

Many flat ss. slabs were found in the  
interval from 1660' 195" to the end of the  
cove. This gully branches + shows  
some rock but the exposure is too  
small, narrow + covered by debris to  
be studied.



Sept 22

Ravine A

Derry - East side valley  
Road at foot of gully at 1310.

1300 - 1345' 45" - list

1345' 45" - 1350' 50" - hard sandy sh. and  
massive fine sandstone with light  
color and uneven weathering. Fossils  
plentiful. Sph. goniatites, pectinoid shells  
Pecten, etc. containing *Scaphites* etc.  
*Complanatella*, etc. The top layer of the  
unit is very hard. The stone is  
very hard.

1350' 50" - 1355' 55" - In the middle of this  
step sandy sh. with *S. pectinatus* etc.,  
*S. truncatus*, *S. caninus*, *P. sectiformis*,  
*C. spinifer*, etc. These are  
soft. Those above and below  
blue gray with considerable gritty  
matter.

1355' 55" - 1360' 00" - list

1360' 00" - 1365' 05" - Top 5' of this interval are  
blue gray gritty shales like those  
below.

1365' 05" - 1370' 70" - 5' at bottom of this  
interval - resistant slightly  
calcareous, sandy shales containing -  

<i>M. concentrica</i>	<i>S. pectinatus</i>
<i>S. caninus</i>	<i>C. mucronatus</i>
<i>S. pectinatus</i>	<i>P. patulus</i>
<i>P. globosus</i>	
<i>S. granulatus</i>	
<i>C. bellistriata</i>	



Section 1933' 135

30'

Section 1905' 114

1265' 65"

Section 1366' 50"  
1265' 65"

H  
A  
T  
U  
S

1301

Each sq. 5' 5"



~~251~~ St. Jameson

About 1/2' above top of interval  
 ✓ *C. constrictus*      *Adiantum*  
 ✓ *S. constrictus*      *P. flabellum*  
*B. ledum*      *T. constrictus*  
*Monoptera* cf. *minuta*      *C. bellistriata*  
*Pholidostrophia*? or *var. humilis*  
 ✓ *P. oviformis*      *S. constrictus*  
 ✓ *M. constrictus*      *S. constrictus*  
 ✓ *S. andaculus*      *M. bellistriata*  
 ✓ *R. spiniferoides*

1375' 70" - 1375' 75" - sandy shale breaking  
 into irregular lumps with 1-  
*P. flabellum*      *C. bellistriata*  
*S. constrictus*      *M. oblongatus*  
*P. constrictus*      *S. constrictus*  
*P. constrictus*      *M. constrictus*  
*P. constrictus*

1395' 100" - 1405' 100" - 3' at top, but top is bottom  
 arenaceous. Sandstone, slightly  
 calcareous breaking into irregular  
 lumps.

*P. flabellum*      *C. bellistriata*  
*P. constrictus*      *M. oblongatus*  
*M. constrictus*      *S. constrictus*  
*P. constrictus*      *M. constrictus*

1395' 100" - 140' 100" - The rock is bluish  
 and sandy with some fossiliferous  
*S. constrictus*  
*C. constrictus*  
*M. constrictus*

1400' 105" - 140' 110" - Shale with  
*S. constrictus* at the top, 1 or 1 1/2'  
 and calcareous-arenaceous rock with  
*P. flabellum*, *M. constrictus*, *T. constrictus*



*S. pennatus*, *S. granulosis*, *S. demissa*,  
~~*S. che...*~~ ~~*Aviculopora*~~

The second *S. demissa* zone then 2nd *S.*  
 commences at the top of 1405' 110"  
 1405' 110" - 1410' 115" - Rock becoming shaly  
 but with much grit - *S. demissa*, *P. rostratus*,  
*T. carinatus*, *S. pennatus*, *M. concentrica*,  
*Leptopteria* sp., *S. undulata*, *S. granulosa*,

1420' 115" - 1425' 120" - *S. pennatus*, *S. demissa*,  
*C. bellistriata*, *P. flabellum*, *Productella* sp.,  
*T. carinatus*, *S. pectulata*, *S. granulosa*, *S. reticulata*,  
*S. parvula*, *S. perplana*, *H. debagi*, *C. aculeata*,  
*S. demissa* disappear, very about the middle of the zone  
 1415' 120" - 1420' 125" - At top *S. granulosa*,  
*T. carinatus*, *S. pennatus*, *Cystodictya* sp.,  
*C. bellistriata*, *R. ledoy*, *A. reticulata*,  
*C. imbricata*, *M. concentrica*, *P. oviformis*,  
*Euplona* { *Productella* sp.

1424' 125" - 1425' 130" - *C. aculeata*, *T. carinatus*,  
*S. pennatus*. The rock is a blue grey  
 shale like the Carville sh.

1435' 130" - 1433' 135" - *T. carinatus* at top  
 here is several layers about 20"  
 thick, bottom *T. carinatus* and *Productella*  
 138' *Mvs.* above (exposed). Collecting poor.



B.

1305 - Tent of hand - bedding

1305 - 1365' 60" - *retus*1365' 60" - 1370' 15" - Hard sandy rock, massive with *I. carinatus*

1370' 65" - 1375' 70" - sandy stone

1375' 70" - 1380' 75" - at bottom 2' sloppy ss. going into massive calcareous ss. with *S. demissa*, *S. andaculus*, *P. flabellum*, *A. reticulatus*, *I. carinatus*, *A. princeps*, *M. concentrica*, *S. pennatus*. This is the second *S. demissa* zone.1380' 75" - 1385' 80" - *A. bulbosus*, *P. flabellum*, *S. pennatus*,1385' 80" - 1390' 85" - blue gray shales abounding in *S. pennatus*, *I. carinatus*, *C. scitulus*; *S. perplena*<sup>1390</sup>~~1400~~ 85" - 1395' 90" - blue gray sh. <sup>soft</sup> *S. pennatus*, *S. granulatus*, *I. carinatus*1395' 90" - 1400' 95" - *C. scitulus*, *I. carinatus*1400' 95" - 1405' 100" - *Pal. constriata*1405' 100" - 1410' 105" - *T. chinensis* - poorly exposed here



1410' 105" — 1412' 105" — *Tichenor* ?

1412' 105" — 1417' 110" — *hiatus*

1417' 110" — 1422' 115" — at bottom 1 1/2' of soft  
blue grey shales with *Taronius*, *C. coronatus*,  
*Crin. hum.* *Crinoid stems*

1422' 115" — 1447' 160" — *hiatus*

1447' 160" — 1452' 165" — bottom 3' *hiatus*  
Soft dark bluish grey shales with  
*C. coronatus*, *A. umbonata*, *Leiopteria*

1452' 165" — 1457' 170" — *S. pinnatus*, *P. rana*

*P. constricta*, *C. bellistriata*, *C. coronatus*,

*C. setigerus*, *Pholidops*, *M. pygmaea*,

*N. oblongatus*, *Lox. hum.*, *Spirigula* sp,

*N. bellistriata*,

1457' 170" — 1462' 175" — *C. acitulus*, *P. rana*,

*C. setigerus*, *Lox. hum.*, *M. pygmaea*,

1462' 175" — 1467' 180" — Bottom 2' same  
Upper 3' *hiatus*

1467' 180" — 1472' 185" — *S. constricta*,

*A. umbonata*, *P. holidops*, *S. pinnatus*,

*M. pygmaea*, *S. radiata*, *P. munda*,

*C. acitulus* cc, *P. rana*,

1472' 185" — 1477' 190" — bottom 2' same

Upper 3' *hiatus*

1477' 190" — 1482' 195" — *hiatus*

1482' 195" — 1487' 200" — *hiatus*

1487' 200" — 1512' 225" — *hiatus* — ravine  
peters out. The mapping here is



incorrect, as the gully disappears at a terrace at about 1600' A.T. The gully was not seen. An Ambocoelia zone follows closely on the Picheon.

The shale of the 2nd S. demissa zone is like the Earlville sh.



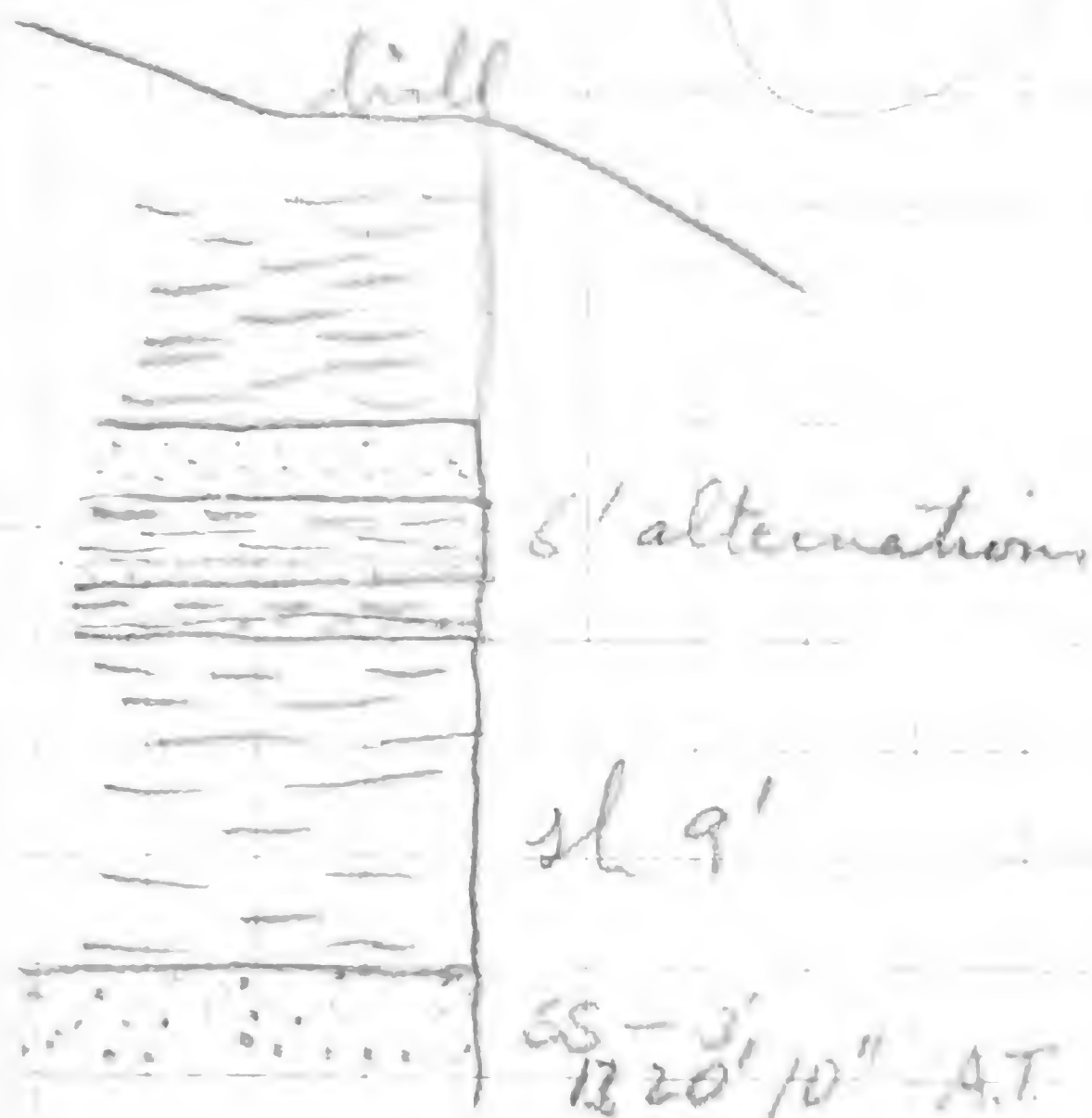
Sept. 25

Demeter Ravine Arab-hill  
 Stream crosses road at 1310' A.T. north end Reservoir

1310' - 1315' 5" - blue grey sandy shales with *S. pennatus*, *C. mucronatus*, *A. spinifer*, *B. leda*, *G. capillaria*, *J. carinatus*. The *S. pennatus* is very abundant.

1315' 5" - 1320' 10" - water in stream-bed. To the south and at the entrance to the ravine is a quarry with a section somewhat as follows.

Each square 3' at the bottom are ss. in for 3' in 2 layers about 1 1/2' thick each. This is succeeded by blue grey shales for about 9' which is followed by ss alternations for about 6'. In the six feet there is at the bottom a 6" layer of ss; then 12" sh., 9' ss., 2 1/2' sandy sh. and finally 1 1/2' layer of ss. This layer is followed by about 7' of blue grey shale.



Fossils in the 1 1/2' layer of ss near the top can be determined from a dislodged block and are *J. carinatus* c.c., *P. flobellum* or *S. pennatus* c. *R. variscensis*.



*A. spiriferoides*  
*M. concentrica*  
*C. bellistriata*  
*P. stylopore*  
*S. parplona*

*Gon. hamiltonensis*  
*C. tenuistriata*  
*S. granulosa*  
*S. perversa*  
*C. princeps*

1320' 10" - 1325' 15" - about 2' below the top  
 of this interval come the <sup>calcareous</sup> mentioned at  
 the bottom of this quarry. These have  
*S. granulosa*, *S. pennatus*, *C. mucronatus*,  
 The blue grey shales on these have  
*S. pennatus* cc  
*I. carinatus*  
*C. acutiuscula* small  
*S. hamiltonensis*  
*S. capillaria*

The sandstones are quite calcareous,  
 even having local concentrations of ls.  
 The shales are blue grey and like the  
 Earlville shales in appearance &  
 texture. The great abundance of long-  
 winged *S. pennatus* is striking.

1325' 15" - 1345' 35" - hiatus

1345' 35" - 1350' 40" - hiatus for 3 1/2'. At the  
 top there are about 1 1/2' of blue grey shale  
 and about 9" of resistant & sandy  
 rock. The latter has *I. carinatus* &  
*S. pennatus* in abundance. *M. trigonatus*  
*A. erectum* in the shaley part.  
*S. pennatus*, *S. arduus*, *M. concentrica*  
*C. carinatus*, *P. lanceolata*, *P. flabellum*,  
*P. emarginata*, *S. capillaria*, *C. bellistriata*,  
*Loxostoma* sp., *C. scitulus*



1350' 40" — 1355' 45" — blue grey shale  
*S. arcuata*, *S. pennatus*, *J. carinatus*,  
*C. bellistriata*, *P. flabellum*, *M. concentrica*,  
*C. scitulus*, *P. constructa*, *P. discoidum*,  
*A. princeps*.

1355' 45" — 1365' 55" — same below for about  
 7' but the top has become more sandy  
 and forms a 10' cascade.

1365' 55" — 1380' 70" — sandy shales for about  
 8' and sandstones for 7'. The passage  
 from the shales to the ss. is very  
 gradual, almost imperceptible. 1380'  
 70" brings the observer to the top of a  
 second cascade. The 1 1/2' on top of 1380' 70"  
 and the very brink of the cascade  
 are calcareous-arenaceous shale rocks,  
 very resistant. *J. carinatus* & *S. pennatus*  
 are the prevailing fossils in the ss.  
 Fossils in the upper 1 1/2' of the 2nd  
 cascade are: —

<i>C. boettji</i> r	<i>P. flabellum</i> r
<i>S. capillaria</i> r	<i>Grammysia</i> sp.
<i>J. carinatus</i> cc	<i>S. granulosa</i> r
<i>A. decussata</i> r	<i>A. reticulatus</i> r
<i>S. pennatus</i> c	<i>A. princeps</i> r
<i>S. demissa</i> (! not in place)	<i>S. perplana</i> r

1380' 70" — 1385' 75" — blue grey fossiliferous  
 shales.

<i>C. scitulus</i> r	<i>S. pennatus</i> r
<i>S. arcuata</i> r	
<i>P. flabellum</i> r	
<i>J. carinatus</i> c	
<i>S. granulosa</i> c	



At 1380' 70" a slab was seen with *S. demissa* in it. The slab appeared to be in place but I could not be sure of it.

1385' 75" — 1390' 80" — blue grey shales with a resistant layer at the top forming a low escarpment.

1390' 80" — 1395' 85" — blue grey shales

1395' 85" — 1400' 90" — blue grey shales with  
*C. scitulus* *J. carinatus*  
*M. concentrica* *S. pennatus*  
*Gon. hamiltonensis*

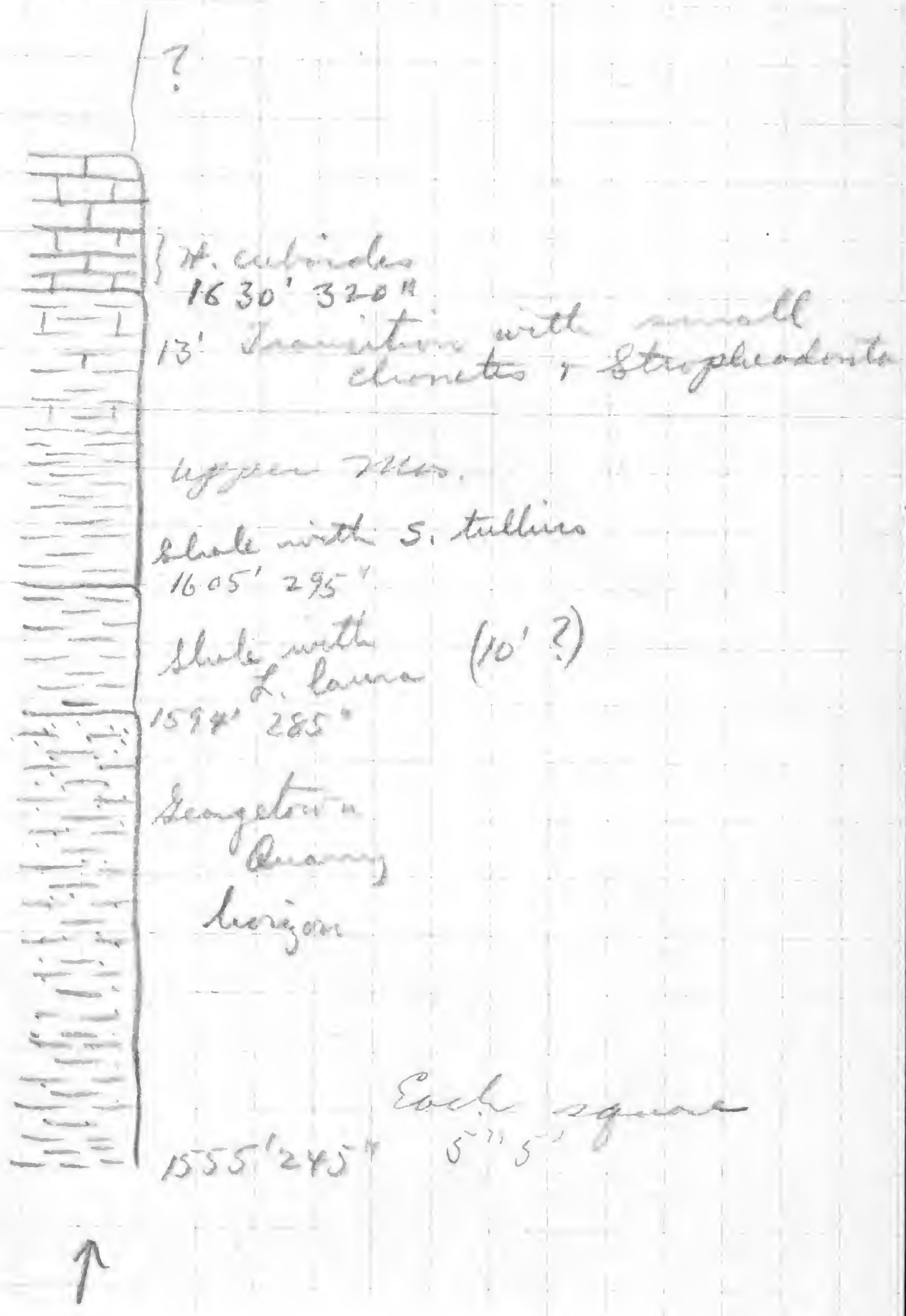
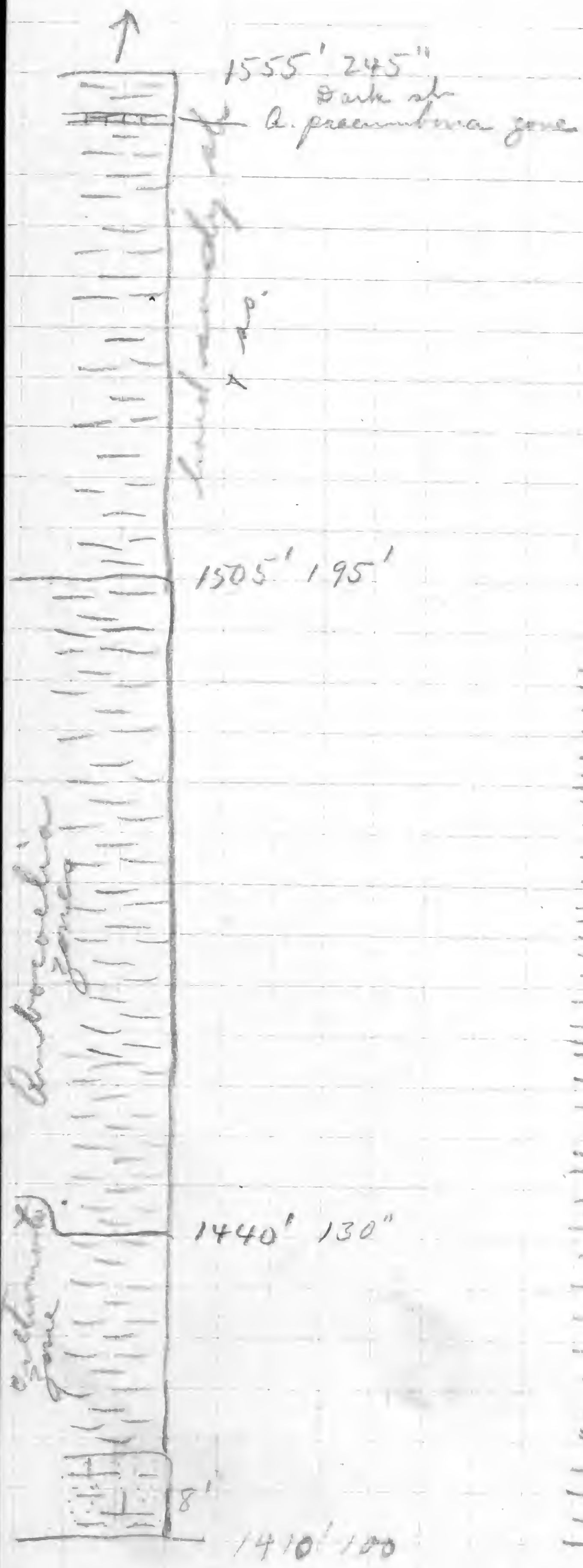
1400' 90" — 1405' 95" — blue grey sh.

*J. carinatus* *B. leda*  
*S. pennatus* *Pal. constricta*  
*C. scitulus*

The shales are not greatly fossiliferous.

1405' 95" — 1410' 100" — These shales continue to about 2' from the top of this interval when two layers of ls. are seen. These are much fluted from solution weathering. Below the ls. there are about 2" of calcareous sandstone. Then a 9" layer of ls. which is blue grey and not unlike the Dully. This lower layer is crowded with shells and some enroid debris. The shells are *S. pennatus*, *J. carinatus*. The second layer is of the same thickness but has practically no fossils.







1410'100" - 1415'105" This is succeeded by calcareous sandy rocks with:-

*P. rana* r  
*S. pennatus* r  
*Crinoid stems* r  
*A. decussata* r  
*R. vanuxemi* r  
*Cran. lam.*  
*Pterinopecten* sp.

*T. carinatus* r  
*S. macronotus* r  
*M. concentrica* r  
*Pal. hamiltoniae* r  
*S. perplana*  
*C. bellistriata*  
*Camarotoechia* sp.

1415'105" - 1420'110" - about 2 1/2' of this horizon is composed of these calcareous sandy shales and the 2 1/2' is capped by about 3" of very hard sandy rock forming ~~sa~~ a cascade above the "Tschener" (?) This 8 or 9' above the ls are sandy calcareous shales and are exceedingly difficult to collect.

On this 2' of dark soft faintly gilty shales with:-

*S. pennatus* cc  
*Brummsia* sp.

*C. scutellus* c

### Moscow

1420'110" - 1425'115" - the shale is quite brittle, and hard but very fossiliferous.

*T. carinatus* c  
*C. macronotus*  
*N. triquetra*  
*Pholadella parallela* c  
*N. bisulcata*

*P. radiata* r  
*B. leda*  
*N. corbuliformis*  
*P. patulus*  
*A. erectum*

1425'115" - 1430'120" - Same

*P. radiata*  
*P. parallela*  
*N. triquetra*  
*Pal. concentrica*

*Leptasteria*  
*Pterinopecten*



1430' 120" — 1435' 125" — same shales.

*N. oblongatus*  
*P. radiata* c  
*S. pennatus*  
*C. setigenus*  
*P. constricta*  
*N. triquetra*  
*S. perversa*

*N. bellistriata*  
*C. scitulus*  
*A. spiriferoides*  
*C. mucronatus*  
*S. leda*  
*C. setigenus*

In the middle of this interval the shales lose their brittleness.

1435' 125" — 1440' 130" — *Chonetes* is very abundant here. *S. perplana*, *A. umbonata*

1440' 130" — 1445' 135" —

*N. bellistriata*  
*C. scitulus*  
*A. umbonata* a  
*S. pennatus*

*Pholidops ham.*  
*P. constricta*  
*N. oblongatus*

1445' 135" — 1450' 140" — *C. scitulus*, *S. pennatus*  
*A. umbonata*, Fossils not very abundant

1450' 140" — 1455' 145" — *C. mucronatus*,  
*C. setigenus*, *A. umbonata*, *T. submarginata*  
*S. pennatus*, *C. scitulus*, *Orthoceras* sp.  
*N. oblongatus*, *Pholidops ham.*, *P. constricta*  
*P. discoides* — at top *Ambocoela* is very rare.

1455' 145" — 1460' 150" — *N. triquetra*, *P. plana*,  
*P. rana*, *H. dekenyi*, *S. pennatus*,  
*C. mucronatus*, *P. constricta*, *C. scitulus*  
*A. umbonata*,

1455' 145" — 1460' 150" — *P. rana*, *P. tenuis*,  
*C. scitulus*, *C. setigenus*, *A. umbonata*,  
*O. undulata*, *S. cheunghensis*,



*C. tenuinotus*, *C. boothi*, *P. radiata*,  
*H. deKayi*, *S. perplana*, *N. bellistriata*  
*O. parvula*, *C. bellistriata*.

1460' 150" — 1465' 155" — same

1465' 155" — 1470' 160" — *I. carinatus*,  
*P. radiata*, *N. bellistriata*, *C. bellistriata*,  
*P. constricta*, *Conus mucronatus*, *C. scitulus*,  
*G. arcuata*, *N. triquetra*, *S. perplana*,  
*C. scitulus*, *P. cylindrica*, *S. pinnatus*,  
*N. lamellata*, *N. oblongatus*,

1470' 160" — 1475' 165" — *Palaeoneilo perplana*?  
*C. indenta*, *S. pinnatus*, *R. fimbriata*,  
*P. constricta*, *C. bellistriata*, *I. carinatus*,  
*C. mucronatus*, *Par. humiltoniae*, *N. oblongatus*,  
*N. bellistriata*, *C. perversa*, *H. acheris*, *S. perplana*,  
*P. rana*,

This horizon is the same as that  
 shown in the ravine at Georgetown

1475' 165" — 1480' 170" — *A. umbonata*, *C.*  
*S. perversa*, *P. emarginata*,

1480' 170" — 1485' 175" — *R. vanuxemi*,  
*A. decussata*, *S. pinnatus*, *A. umbonata*,  
*N. concentrica*, *C. indenta*, *S. granulatus*,  
*P. radiata*, *R. fimbriata*, *C. scitulus*,  
*N. triquetra*,

1485' 175" — 1490' 180" — *C. scitulus*,  
*C. bellistriata*, *S. mucronatus*, *C. mucronatus*,  
*A. umbonata*, *A. reticularis*, *S. granulatus*,  
*A. umbonata*, *I. carinatus*,



1490' 180" — 1495' 185" — *R. fimbriata*,  
*M. concentrica*, *S. perversa*, *P. constricta*  
~~*P. h. h.*~~ *Par. hamiltoniae*, *P. rana*,  
*S. granulosa*, *A. reticularis*, *P. tenuistriata*  
*R. reticularis*, *C. tenuistriata*, *C. coronatus*,  
*S. perversa*, *S. granulosa*, *R. umbonata*,  
*T. carinatus*, *H. aelis*, *H. triquetra*, *G. capillaria*,  
*C. mucronatus*

1495' 185" — 1500' 190" — *P. rana*, *H. oblongatus*,  
*P. muta*, *H. triquetra*, *G. capillaria*,  
*C. coronatus*, *H. bellistriata*, *C. mucronatus*,  
*T. rostellata*, *P. discoideum*, *P. constricta*,  
*S. pennatus*, *O. undulata*,

1500' 190" — 1505' 195" — same — *Ambocoelia*  
 appears to run out here + 2'

1505' 195" — 1570' 200" — 2' above the lowest  
 portion of this interval comes a calcareo  
 arenaceous band that forms a cascade,  
 This is 2 or 3' thick. It has *T.*  
*carinatus*, *P. rana*, *Aviculopecten* sp.,  
*H. bellistriata*

At the top of this interval: —  
*P. radicata* *H. bellistriata*  
*H. oblongatus*, *H. triquetra*

1510' 200" — 1515' 205" — hard sandy  
 sh: — *C. tenuistriata*, *H. bellistriata*,  
*S. crotalum*,



1515' 205" — 1520' 210" — limy sandy shale with *N. bellistriata*, *S. granulatus*, *Liopteria* sp., *R. capillaria*,

1520' 210" — 1525' 215" — hard calcareo-arenaceous rock with *S. granulatus*, *M. mytiloides*, *I. carinatus*, *S. arcuata*, *C. mucronatus*.

1525' 215" — 1530' 220" — *S. pennatus*, *M. mytiloides*, *S. perversa*, *C. boottii*, *C. mucronatus*, *C. scitulus*, *Cyst. ham.*, *R. ledae*, *S. channingensis*, *C. tenuistriata*, *I. carinatus*,

1' above this interval in the next.  
9" of calcareo-arenaceous rock.

1530' 220" — 1545' 235" — hiatus.

About 2' below 1545' 235" come shales with *R. fimbriata*, *A. reticularis*, *N. liata*, *Cyst. ham.*, *Cystodictya*, 1562

1545' 235" — 1550' 240" — *Platyceras* sp., *R. vanuxemi*, *C. scitulus*, *Orthoceras* sp., *S. pennatus*, *I. carinatus*, *A. reticularis*, *S. perversa*, *S. rana*, 1576

1550' 240" — 1555' 245" — <sup>foot</sup>one <sup>up</sup> in this there is a 4" limy band with *A. spiniferoides*, *I. carinatus*, *I. laura*, *A. praeimbona*, *P. constructa*, *M. mytiloides*. Upon this hard layer are shales with *A. spiniferoides*, *I. laura*, *S. pennatus*, *S. granulatus*, *S. andaculus*, *I. carinatus*, *N. corbuliformis*.



1555  
28  
620

1423  
1618  
25  
1545  
19  
1555

265

1616  
1584  
54

1618  
265

1618  
1597  
21

1597  
1595

1575

1515

*P. rana*,

The shales extend up. for 4'. but then are covered. I did not observe *S. tullus* here.

1555' 245" — 1575' 265" — hiatus — a few feet of dark unfossiliferous sh. was seen at 1555' 245" — 1560' 250".

1575' 265" — 1580' 270" — ~~small~~ compact *Taomum* — apparently diagnostic of upper Moracow. The shale is hard & sandy.

1580' 270" — 1585' 275" — sandy shale with *O. undulata*, *S. pennatus*, *H. triguter*, *J. carinatus*, *P. tenuis*, *P. patulus*, *L. rostellata*, *P. rana*, *H. stratus*, *H. achis*, *C. tenuistriata*.

1585' 275" — 1590' 280" — In the middle of this interval there is a one foot sandstone (calcareous band).

1590' 280" — 1595' — 285" — these sandy calcareous hard rocks terminate at 1594' 285" and represent the hard rocks seen in the quarry at Georgetown. They are succeeded by soft dark sh. 1' in this step.

1595' 285" — 1600' 290" — *S. pennatus*, *C. setigenus*, *P. emarginatus*, *L. laura* rare in the 1st 3'. *H. oblongatus*,



1600' 290" — 1605' 295" — same but  
 without *L. laura* — exact range <sup>would not</sup> be determined  
 1605' 295" — 1610' 300" — <sup>it must be 10' or</sup> here *S. tellius*  
 becomes rather prominent along  
 with *G. carinatus*. Other fossils are  
*C. scitulus*, *C. setigerus*, *M. lirata*,  
*N. corbuliformis*. The shales also become  
 harder + coarser here.

1610' 300" — 1615' 305" — *R. reticularis*  
*A. princeps*. Shale soft. collecting is  
 very difficult as the ravine is very  
 steep and choked with debris.

1615' 305" — 1620' 310" — Hard sh. few fossils

1620' 310" — 1630' 320" + one foot brings the  
 base of the Tully. This brings the base  
 of the Tully at 1658'. The rock in this  
 interval is hard, much of it calcareous.  
 Collecting is difficult if not almost  
 impossible. *C. setigerus*

In the shales below the first  
 conspicuous ls. band of the Tully  
 which bears abundance of  
*H. cuboides* were seen abundant  
 small *Chonetes* + *Strophodontas*.  
 These may be *Chonetes aurora* and  
*S. mucronatus* respectively. I cannot  
 place them in the Hamilton. The  
 lowest these were seen was  
 in a resistant ledge at 1621' 310".  
 3' below this ledge *S. pennatus* is  
 common in the shale. 6' below



this hard layer were seen  
*C. boothi* & *C. tenuistriata*. The top of  
 the Moscow must be at about  
 1618' 307". The rock just below the  
 1st bed with *Hypothyris* breaks in  
 elongate masses like that at  
 Jinkens Falls. There are about  
 13' of transition rocks, below the  
*Hypothyris* bed and on top of the  
 Moscow.

Hard-levelling down from base  
 of *H. cuboides* zone there were 44  
 steps

In this ravine I did not  
 actually find *S. demissa* in place  
 but I believe the horizon is 30'  
 below the "Tichenor". The Tichenor  
 is like that elsewhere seen. On the  
 Tichenor were about 8' of calcareous  
 sandy shales, then come shales, which  
 were quite soft and contained  
*Pholadellus*. I believe this belongs to  
 the *Orthonota* zone of Cleland. Above  
 this the *Ambocoelia* zones could be  
 followed. There are 95' of shales in  
 the *Ambocoelia* & lower zones, and about  
 81 or 82' (71 or 72' minus transition) zone of  
 rock from the *A. praeumbona* zone to  
 base of Tully.

There appear to be about 13' of  
 limer shales between the first bed with  
*H. cuboides* and the top of the shales. The  
 close of the Moscow is at the hard



268

268

shales with abundant *Spermatozoa*



Sept 32269  
Derryter  
Ravine C

269

*S. demissa* zone at 1310' A.T. + 70' 70".

Tichenor at 1310' + 95' 95". The Tichenor is exactly 5 hard level steps above the *S. demissa* zone.

The Tichenor occurs at 1413' A.T. It is here in 3 layers, and is about 2' thick. It is not crinoidal to a marked degree here & looks like the Tully.

On the Tichenor comes about 5' of hard calcareous stone.

15' above Tichenor stone is a blue grey shale with *M. subulata*, *P. lutea*, *P. lutea*, *A. umbonata* seen between 5 + 6 steps.

at 10<sup>th</sup> step *C. mucronatus* c.

at 21<sup>st</sup> step a hard band with *L. pygmaea*

Bottom of Tully is at 1657'.



Sept. 10.

Hand drilling begun at 815' A.T.

Upper part on Shennanshi estate - Shennanshi gully.  
Q.C. Snyder.

815' - 885' 70" - covered

885' 70" - 890' 35" - very dark grey fine grained shale with some white streaks. Shennanshi like the Marcellus.

890' 35" - ~~945'~~ 945' 130" - same dark grey soft shale, irregular fracture, irregular fossils anywhere. 25 feet below the top of the 130' line a brownish layer of sandstone, septaria. Small amount of *Orthis* sp. *P. discolor* common.

*Orthis* sp. *P. discolor*

945' 130" - 990' 175" - covered

990' 175" - 1010' 195" - soft dark grey shale, brownish. *Orthis* sp., *P. discolor* common.

1010' 195" - 1015' 200" covered

1015' 200" - 1045' 230" - same shale, few fossils.

*Orthis* sp. *P. discolor*

1045' 230" - 1050' 235" - covered

1050' 235" - 1055' 240" same shale

*Orthis* sp. *P. discolor*

*P. discolor* *P. discolor*

*Orthis* sp. *Orthis* sp.

1075' 245" - 1080' 265" - shale with small pieces of *Orthis* sp.

small pieces of *Orthis* sp. *Orthis* sp.

*Orthis* sp. *Orthis* sp.

*Orthis* sp. *Orthis* sp.

1080' 265" - 1085' 270" - same shale

*Orthis* sp.

1085' 270" - 1090' 275" - same shale

*Orthis* sp. *Orthis* sp.

*Orthis* sp. *Orthis* sp.

*Orthis* sp. *Orthis* sp.

*Orthis* sp. *Orthis* sp.

*Orthis* sp.

1095' 275" - 1095' 280" - same shale, softest, *P. constricta*

*Orthis* sp. *P. constricta*

*Orthis* sp. *P. constricta*

*Orthis* sp. *P. constricta*



35  
38  

---

70



1105' 285" - 1106' 285" - covered, stream beds here

1106' 285" - 1116' 295" - covered. In the other gully, the upper 3' is massive sandy shale with a fossil like that below.

1116' 295" - 1120' 305" - hard massive shale with scattered no fossils. Shale breaks into thick lumps and breaks like an irregular mass of clay in the stream bed.

1120' 305" - 1125' 310" - covered

1125' 310" - 1130' 315" - covered. Upper 3' ✓ massive conglomerate with *Quadrata*

✓ 1130' 315" - 1135' 320" - covered with

*Producta* *P. subquadrata* *Camarotoechia*

1135' 320" - 1140' 325" - same shale

*Camarotoechia* *G. subquadrata* *P. subquadrata*

*Quadrata* *H. subquadrata* *P. subquadrata*

1140' 325" - 1150' 335" - covered

1150' 335" - 1160' 345" - hard massive shale like that in the lower part of Knight gully.

*H. subquadrata* *P. subquadrata* *P. subquadrata*

*P. subquadrata* *P. subquadrata* *Camarotoechia*

✓ 1160' 345" - 1165' 350" - covered. 4' covered.

Upper 1' same hard sh. but more

fragile and breaking into soft

*H. subquadrata* *G. subquadrata* *Camarotoechia*

*P. subquadrata* *H. subquadrata* *H. subquadrata*

*P. subquadrata* *H. subquadrata* *P. subquadrata*

✓ 1165' 350" - 1170' 355" - soft shale. Fossils are not abundant till about 2' above the base of this interval.

*H. subquadrata* *H. subquadrata* *H. subquadrata*

*H. subquadrata* *H. subquadrata* *P. subquadrata*

*H. subquadrata* *H. subquadrata* *Camarotoechia*

At the top of the interval is about 12" of harder rock forming a fall. The following were seen in the upper rock:

*G. subquadrata* *C. subquadrata* *P. subquadrata*

*P. subquadrata* *P. subquadrata* *P. subquadrata*

*P. subquadrata* *P. subquadrata* *P. subquadrata*

*P. subquadrata* *P. subquadrata* *P. subquadrata*



$$\begin{array}{r} 26 \\ 5 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 1320 \\ 1200 \\ \hline 120 \end{array}$$



*S. rotatum**H. lineatum**C. undulata**R. fimbriata**T. caninatus**H. dekeyri**A. princeps**B. subconjugata**H. concinna**H. oblongatus**M. pygmaea**Pholidops**Parenchyma**Pachyramphus**P. flabellum*

The hard layer consists of ls. and some shale, the lime at the bottom. The *Tropidoleptus* zone comes about 3' below the calcareous layer with the corals. On a level about 14' up from the side gully at 1100' 18" to the top of the Mottled hard layer.

Top of *Dalmanites* at about 1320' AT. diving about 170' for the *Dalmanites*. I have drilled out of the marine at 1400' which I believe is of excessive by 20'.



1955  
15.50

205  
135  
70



Sept. 2.

Fossils seen in blocks of rock from upper ledge of upper falls at Delphi

*P. spinulosa* a *Par. hem.*

*P. rose* *P. marginata*

*Euphorbia* ? *S. pinnatifida*

*Urtica* *H. ovata* *S. pennatus*

*Cystis* as it is found

A block with *C. ovata*, *H. ovata*, *A. rose* in abundance was seen ~~at the~~ at the base of the lower falls showing slumped from above.



Sept 18.

Ravine (1) at Eneville on  
Property of L. C. Burton.

40' above the railroad tracks at about <sup>1557</sup>~~1667~~  
A.T. are found large exposures of  
arenaceous shale, which in the lowest  
layers carry abundance of *S. pennatus*  
and *L. laura*. The rock is blue grey arenaceous  
shale in a large exposure.

Fossils seen in the debris about the  
exposures are:—

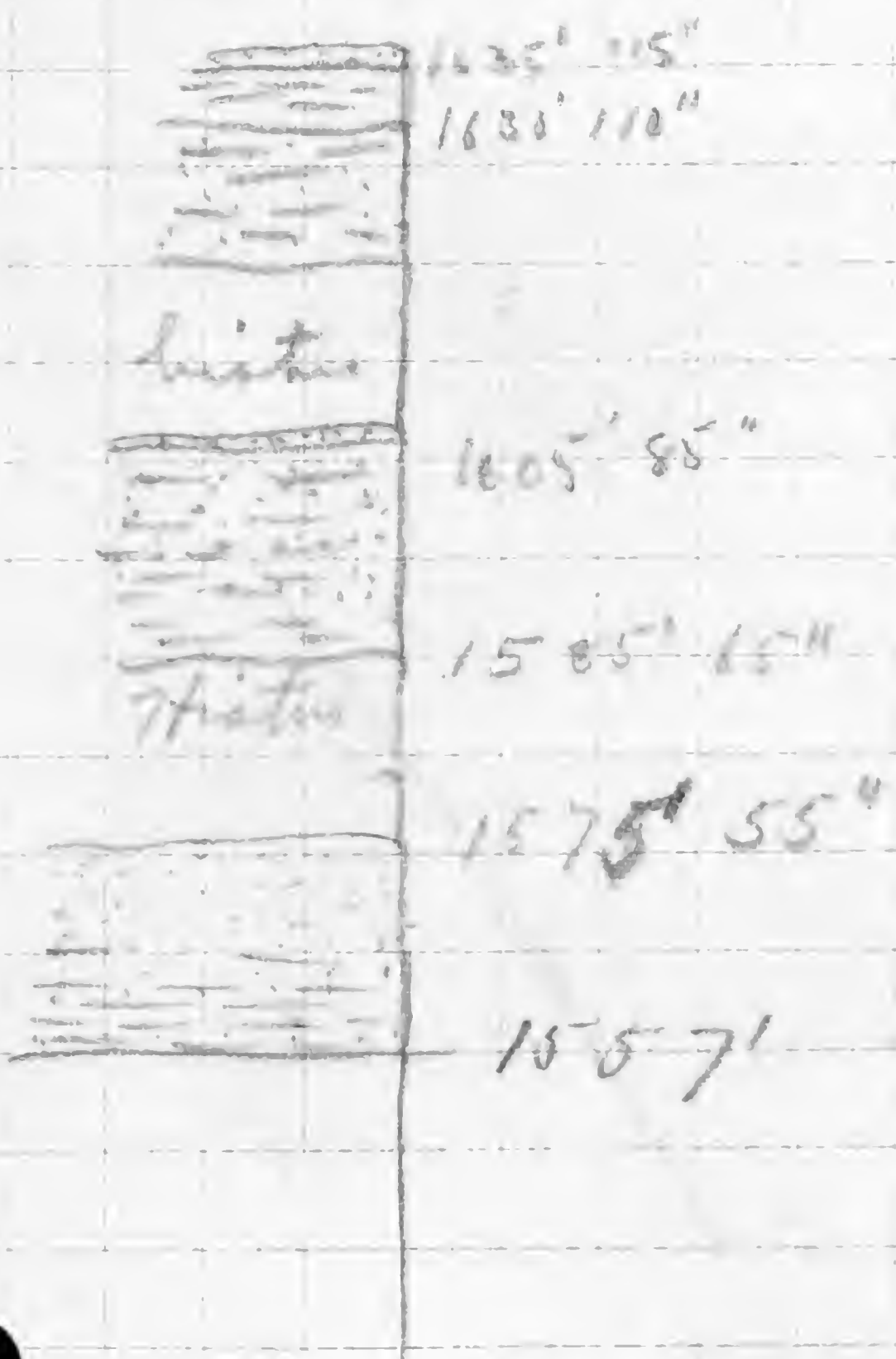
<i>S. pennatus</i> a	<i>Gnampteria</i>
<i>L. laura</i> ? a	<i>N. trigaster</i>
<i>T. submarginata</i> 4	<i>Leiopteria</i>
<i>C. coronatus</i>	
<i>P. flabellum</i>	

*P. flabellum* is fairly common at about  
45' above the rr. tracks. The *S.*  
*pennatus* is very broad-winged. The  
*L. laura* is very large and coarse-  
ribbed.

The lowest 5' of rock is most  
certainly a sandy shale but this  
becomes coarser and the *L. laura*  
disappears in this interval. The rock  
becomes continually sandier and more  
resistant to wear. It breaks into  
large slabs. It is grey in color.  
Fossils seen in the ss 10' from  
the bottom of the exposed are  
long-winged *S. pennatus* &  
*P. flabellum*.

At the 11<sup>th</sup> step above the rr. comes  
an abrupt change in lithology from  
the sandstone to a coarse sandy





15 20  
55 55

Each square 10'



shale rather dark grey in color.

● The lower rock is decidedly sandy for about 12 or 15'

*S. granulatus* re

*S. pennatus* re

*P. radiata* re

*S. concava* (2)

*M. concentrica*

*S. perplana* ~

*R. spiriferoides*

*I. cuneatus*

*P. oviformis*

*P. flabellum* ~

*Gram. hamiltoniae*

*C. boothi*

This is exposed for 5' or more.

Some of rock at contact is briny.

The abrupt change in lithology and the large number of *Strophodontas* is here very striking. The exposure differs in many respects from that at Fabius, notably in less abundance of *P. flabellum* and in the presence of large numbers of *S. concava*.

At 13 steps above R.R. (1585' 65") there is a small cascade over sandy shale. The cascade is about 7' high.

1585' - 65" - 1590' 70" - *S. pennatus* c, *I. cuneatus* c, *C. micronatus* c, *S. tullius*?, *C. coronatus* re. It is a coarse light bluish grey sandy shale.

1590' 70" - 1595' 75" - *Cyrt. ham.* c, *I. cuneatus* c, *S. pennatus* in a hard sandy rock.

● 1595' 75" - 1600' 80" - The rock has become increasingly sandy and paves the floor of the brook. A typical slab of this ss carries the following: -



*C. coronatus* n.  
*Cyrt. ham.* n.

*C. mucronatus*, cc  
*S. pennatus* c

1600' 80" — 1605' 85" — the stone is  
 shaken in a small cascade here &  
 has *Orthoceras* sp, *J. carinatus*?, *H. debayle*,  
*S. pennatus*, *Cyrt. ham.*, *S. granulatus*,  
 About 2' from the top of this  
 interval there 3" of hard calcareo-  
 arenaceous rock, light blue-grey in  
 color with few fossils. The only ones  
 noted were *P. rana*, *S. tullius*,  
*C. coronatus*, *Cyrt. ham.*, *S. perversa*,  
*S. perplana*.

1605' 85" — 1620' 100" — 2' below the top of  
 this interval the first rock is seen  
 above the calcareo-arenaceous band  
 noted above. It is a sandy shale the  
 true color of which cannot be made  
 out. Fossils here are:—

✓ *S. pennatus* c  
*M. oblongatus*  
*S. ellipticus*  
*P. flabellum*  
*P. radiata*

151?

77

1620' 100" — 1625' 105" —

same, as cascade

✓ *C. mucronatus*

*P. constricta*

✓ *M. concentrica*

✓ *S. perplana*

✓ *P. flabellum*

*A. fasciculatus*

✓ *S. pennatus*

*Orthoceras* sp.

✓ *J. carinatus* c.

*P. liata*

✓ *J. submarginata*

*A. erectum*

*N. liata*



1625'105" - 1630'100" The cascade flows  
 over harder sandy rock in  
 which may be seen *P. flabellum*,  
*J. corinatus*, *S. perplana*, *A. spiniferus*,  
*P. radiata*, *R. oviformis*, *M. concentrica*,  
*S. pennatus*, *C. tenuistriata*, *C. bellistriata*,  
*S. perplana*, *J. corinatus*, *C. mucronatus*,  
*P. flabellum*, *H. debayi*, *S. granulatus*

1630'110" - 1635'115" - sandy shales with  
 at 1635'115" - the rock is thin slabby  
 sandstone for 6 or more inches  
 containing *S. perplana* + *J. corinatus*

1635'115" - 1640'120" - coarse shales &  
 thin sandstones.

1640'120" - 1645'125" - a 1/2' layer of  
 calcareo arenaceous stone at the  
 top of this interval has: *S. pennatus*,  
*J. corinatus*, *P. flabellum*, *M. concentrica*,  
 At the top of this horizon the rock  
 is a shale & has: - *S. pennatus*,  
*M. concentrica*, *P. flabellum*, *C. boothii*,  
*P. oviformis*, *C. bellistriata*, *A. reticularis*,  
*A. princeps*, *S. perplana*, *C. scitulus*,  
 The shale is rather soft & much  
 discolored by rust. *S. granulatus*,  
*Taorminus*, *Hirtus* for all but about  
 1' at bottom

1645'125" - 1650'130" - *Hirtus* for all but  
 a foot at top - sandy sh. with  
*S. perplana*, *S. pennatus*,  
*P. oviformis*, *Taorminus*, In the  
 stream bed at the top of this interval  
 some calc coated in rock



makes it hard & resistant.

● 1650' 130" - 1655' 135" - the rock is a blue grey gritty shale with  
*M. concentrica*<sup>c</sup>, *S. pennatus*<sup>c</sup>, *J. carinatus*<sup>c</sup>  
*P. flabellum*, *A. serpens*, *S. granulosa*.

1655' 135" - 1685' 165" - road = 1699' A.T. -

A small amount of Moscow was seen in this ravine south west of the road but it was patchy & I did not work it.

Roadside section from fork.

● Road intersection at 1720' A.T.

1720' - 1725' 5" - hiatus

1725' 5" - 1730' 10" - rather soft, dark blue-grey shales with *C. setigenus*<sup>c</sup>, *A. umbonata*, *C. boothi*, *C. scitulus*

1730' 10" - 1735' 15" - same kind of sh.

*J. submarginata*, *S. pennatus*  
*A. umbonata*, *C. scitulus*

These shales fracture into small blocks and on the surface weather to a purple color.

1735' 15" - 1740' 20" - *S. pennatus*<sup>c</sup>, *C. boothi*, *C. scitulus*, *N. corbulariformis*, *S. perplanus*, *O. undulata*, *N. trichter*, *C. mucronatus*, *J. submarginata*, *A. umbonata*, *S. capillatus*, *Arctiopecten* sp.,

● 1740' 20" - 1745' 25" - similar sh.

*N. lirata*, *C. scitulus*, *Cyst. harr.*  
*N. dehayi*, *J. submarginata*  
*C. coronatus*, *N. globosa*, *S. pennatus*



188

4





*C. scitulus* is very abundant here

1745' 25" - 1750' 30" -

*C. bellistriata* c  
*N. bellistriata*  
*O. carinata*  
*A. umbonata*  
*C. scitulus*  
*N. varicosa*  
*H. dekeyi*  
*Platyceras* sp.  
*S. pectinata*  
*R. frimbriata*

*S. capillaria*  
*P. rana*  
*T. carinatus* c  
*S. pennatus*  
*Leiopteria* sp.  
*Neplritoceras* sp.  
*Cyst. ham.*  
*C. coronatus*  
*Pterinopecten* sp.  
*Pal. constricta*

1750' 30" - 1755' 35" -

*M. mytiloides*  
*T. carinatus* c  
*H. capillaria*  
*C. bellistriata*  
*Productella* sp.

*S. pennatus*  
*A. tetrastulid* (*E. hillebrandi*)  
~~*S. pectinata*~~ *Cyst. ham.*  
*Leiopteria* sp.  
*N. bellistriata*

1755' 35" - 1760' 40" - same

1760' 40" - 1765' 45" -

*S. perversa*  
*M. concentrica*  
*S. granulosa*  
*Pal. constricta*

*Leiopteria* sp.  
*A. umbonata*  
*Trigula* sp.

1765' 45" - 1770' 50" - *S. granulosa*  
*S. pennatus* *S. perversa* (large)  
*C. uncinatus* *N. triquetra* *Cyst. ham.*  
*C. scitulus*, *P. radiata*, *R. vanderhami*  
*A. umbonata*, *P. rana*.



1770' 50" - 1775' 55" -

*M. concentrica*  
*A. umbonata*  
*Grammysia* sp.  
*A. serpens*  
*C. tenuistriata*  
*S. perversa* c  
*R. fimbriata*

*R. vanuxemi*  
*P. rana*  
*S. pennatus*  
*H. liata*  
*C. coronatus*  
*S. granulatus*  
*H. achis*  
*O. undulata*

1775' 55" - 1780' 60" -

*A. serpens*  
*S. granulatus*  
*R. fimbriata*  
*C. tenuistriata*  
*C. mucronatus*  
*S. perplana*  
*C. coronatus*  
*A. blastoid*  
*A. crucioid*  
*Par. lan.*

*M. mytiloides*  
*M. concentrica*  
*S. pennatus*  
*S. crotatum*  
*R. vanuxemi*  
*C. boothii*  
*T. carinatus*  
*A. umbonata* ~  
*G. capillaria*

1780' 60" - 1785' 65" -

*T. carinatus*  
*A. umbonata*  
*S. granulatus*

*P. oviformis*  
*S. junia*  
*O. undulata*

1785' 65" - 1790' 70" - Shales here are weathered to an olive grey. & are mostly unexposed. *P. entalginata*

1790' 70" - 1795' 75" - Very hard rock with *S. pennatus*, *T. carinatus*

1795' 75" - 1800' 80" - The hard layer is exposed for about 2' then comes shales again. with *Grammysia* sp.







1800' 80" - 1805' 85" - The rock on the top of the hill is hard and sandy, having abundance of *T. carinatus* and *Tachurus*, and huge *Strophodontas*, *S. junia*, *S. perplana*,

1805' 85" - 1810' 90" - top of hill  
*T. carinatus* cc  
*S. perplana*  
*Leiopteria* sp.  
*C. mucronatus*  
*M. concentrica*  
*Cyst. lam.*

This shale is sandy and much harder than that below

1810' 90" - 1815' 95" - hiatus  
 1815' 95" - 1820' 100" blue grey shales with  
*A. reticularis*, *P. rana*, *Aviculopecten*,  
*S. pennatus*, *M. concentrica*,  
*Cystodictya*, *Arthracanthus* sp.  
 1820' 100" - 1825' 105" - *S. pennatus*, *T. carinatus*,  
*Pal. constricta*, *P. rana*, *N. oblongatus*.

1825' 105" - 1830' 110" - wood, *S. pennatus*,  
*P. rana*,

1830' 110" - 1835' 115" - *S. pennatus*, *C. scutellus*,  
*M. concentrica*, *A. reticularis*

1835' 115" - 1846' 135" - At the top of the hill about 3' of rock is exposed a dark blue grey weathered shale that has fallen to fragments. The shale from 1815' 95" to the top of the hill is all blue grey, gritty but rather soft, breaking into thick irregular lumps



Burton's  
Ravine

sh. - 3'  
covered

Lead  
Section

1855' 12"

1835' 10"

1830' 10"

1825' 10"

1820' 10"

1815' 9"

1810' 9"

1805' 85"

1800' 85"

1795' 75"

1790' 70"

1785' 65"

5' 10"

1780' 60"

1775' 55"

1770' 50"

1765' 45"

1760' 40"

1755' 35"

1750' 30"

1745' 25"

1740' 20"

1735' 15"

1730' 10"

1725' 5"

1720'

32'

Covered

1685' 165"

1655' 125"

1650' 130"

1645' 125"

1640' 120"

1635' 115"

16280' 110"

1625' 105"

1620' 100"

1615' 95"

1610' 90"

1605' 85"

1600' 80"

1595' 75"

1590' 70"

1582' 65" - 1585' 65"

1572' 55"

1582'

1587'

5 1/2'

5 1/2'

11'

7 1/2"

5 1/2"

65'

sh. soft

covered

blue gray sh.

covered

covered

Clear sh.

some

sandy sh.

sandy shale

2' sandy sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

sh.

4 1/2"

1 1/2"

3'

24' 8"

16'

10'

11'

125'

10'

5'

104

105

106

1517

1518

1519



282

282



Sept 5.

New Woodstock.

84' above highway in ravine are heavy-bedded ss for 1 1/2' feet.

Covered 5' 5"

The covered interval is succeeded by soft bluish-grey shale 2' passing into ss. In the 2' of shale were seen:-

*T. cuneatus* 2*S. permatensis*

Following the shale is heavy-bedded ss for 9'

*L. jureia**T. cuneatus**A. granulosa**S. permatensis**C. tenuistria**S. perversa*

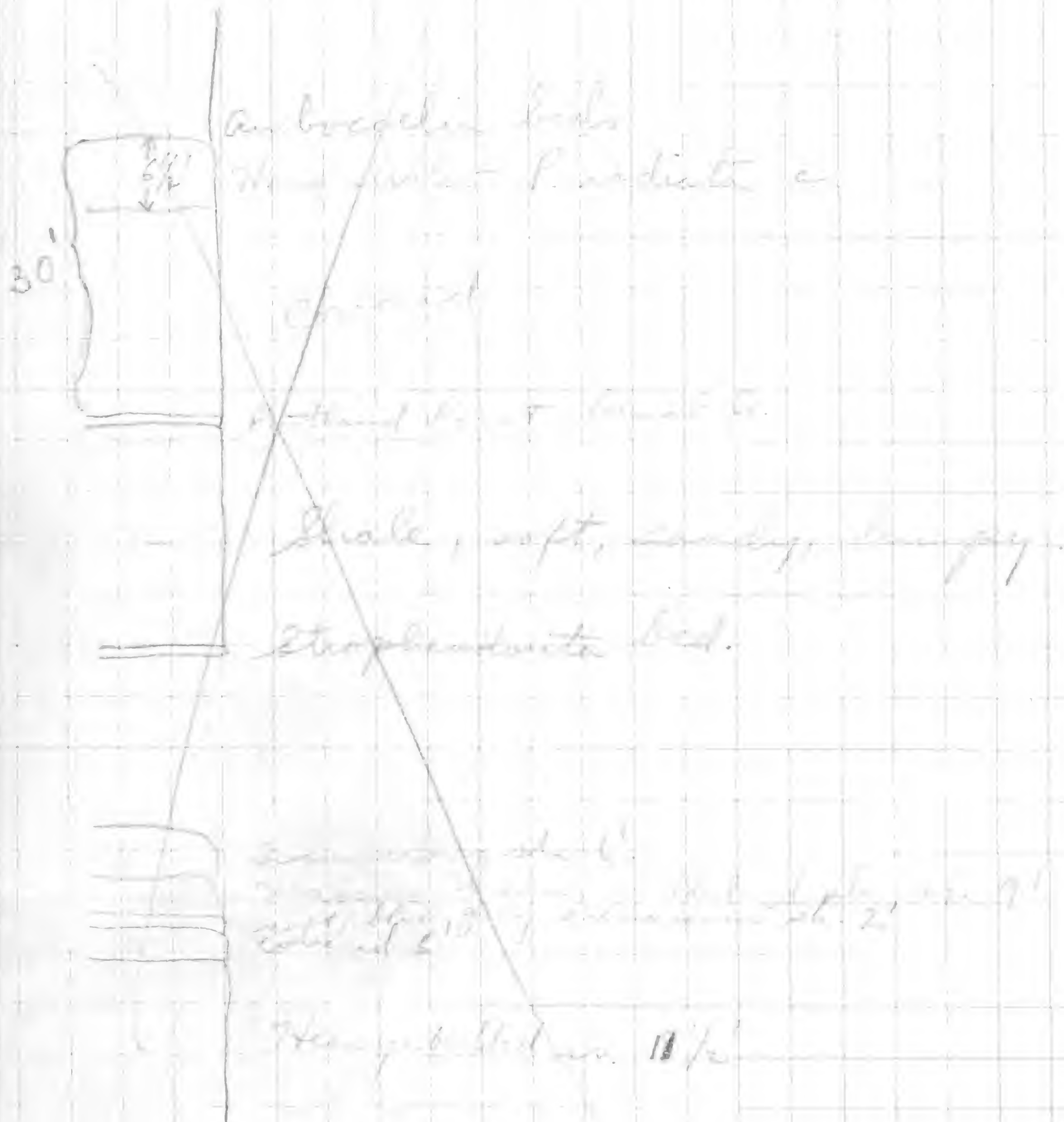
The ss is followed by micaceous shale for 6'

*H. elongatus**H. bellicatus**T. cuneatus*



section at New Woodstock, Maine

See next page  
for section





~~303~~  
J. H. Hunts ravine

Portland Point — Occurs at 1533' above sea level.  
 The basal limy bed is about 6" thick and  
 consists of a limy sandy shale with  
 thin masses of more calcareous material.  
*V. pustulosa* is common in the limestone.  
 30' above the P.P. horizon comes the Ambocoelia  
 beds of the Ovid. Below these at 26-32' above  
 the P.P. were hard massive shales abundantly  
 in *S. pennatus*, *P. radiata* and *C. mucronatus*.

## Pholidostrophia bed — Fossils.

<i>P. flabellum</i>	<i>C. mucronatus</i>
<i>H. concentrica</i>	<i>L. granulosa</i>
<i>T. carinata</i>	<i>L. decussata</i>
<i>L. pinnatus</i>	<i>P. iowensis</i>
<i>L. paphos</i>	<i>A. spiniferoides</i>
<i>L. pinnatus</i>	<i>P. radiata</i>

The Pholidostrophia bed here is not  
 well defined but caps a low escarpment  
 over sandy rocks. *P. iowensis* is just  
 as abundant as on the Tully & Skane-  
 sheets.

(d.H.)

Behind Hunts' farm house is an exposure  
 (30' high) mostly in bluish grey arenaceous shales  
 characteristic of the lower Ludlowville.  
 Fossils:

<i>S. demissa</i>	<i>H. concentrica</i>
<i>A. spiniferoides</i> c	<i>Pal. tenuitesta</i>
<i>S. pinnatus</i> c	<i>A. quadrata</i>
<i>P. flabellum</i>	<i>L. laeva</i>
<i>C. carinata</i>	<i>T. submarginata</i>
<i>L. paphos</i>	<i>S. pinnatus</i>
<i>H. wanyan</i>	

From the road at Hunts house to the first  
 exposures in the gully is 70'. This puts the  
 Portland Point basal bed at 1533' above sea level.



Ambrosia beds & Mesozoic

8' *Platystrophia* bed

21' covered

*U. punctilosa* - 6" Post-Cor. & Point 1533' AT.

Massive shale 30'

← *S. demissa*

Heavy bedded shaly ss.

sandy shales heavy bedded

27'

11' covered

Argillaceous sh. soft at base 6 1/2'

*P. isosensis* 3"

11' very argillaceous sh. at base heavy bedded above 11'

covered 5'

Heavy bedded ss. 11 1/2'

covered 25'

First app. argillaceous

30' Blue gray argillaceous sh.

15' covered

road



Sept 5'

Bridge is at about 1315' A.T.

Section on L. Creek E. of New Woodstock bridge.

The first rock is in a low cascade 2' high of blue grey arenaceous shale culminating in a thin layer of harder rock. Fossils are:

<i>S. penatus</i>	<i>S. crenatus</i>	<i>S. channingi</i>
<i>C. scitulus</i>	<i>C. boothi</i>	<i>C. setigenus</i>
<i>N. oblongatus</i>	<i>D. bisulcata</i>	<i>C. incinus</i>
<i>C. muscatus</i>	<i>G. umbonata</i>	<i>P. patulus</i>
<i>P. fragilis</i>	<i>C. elongata</i>	<i>M. aculeiformis</i>
<i>M. bilobata</i>	<i>G. arcuata</i>	<i>P. constata</i>

Above this cascade is another about 2 1/2' high in the same material. The shale above this cascade becomes harder and ultimately a coarse sandy rock. Fossils in the 2 1/2' cascade are:

*P. constata* *C. crenata*

Above this cascade is 1 1/2' of rock in a falls over at least 3' of coarse shale. The top of this falls is at about 1333' A.T. The bed is a considerable flat in the stream. The top bed is calcareous and exceedingly hard. Fossils seen in the rock bed are:

*S. penatus* *S. crenatus* *S. channingi* *S. junia*  
*C. acrostosa* *C. setigenus* *C. incinus* *E. bilobata*  
*G. granulosa* *G. umbonata* *G. arcuata*

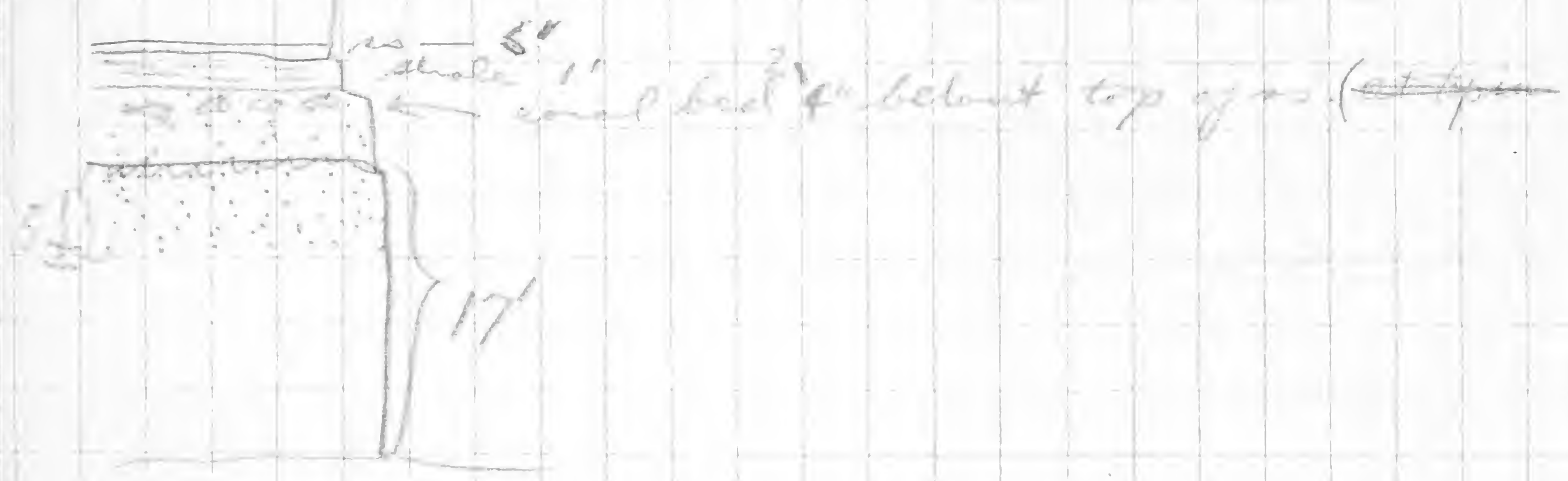
Above the top of the falls is about 1' of shaly ss. then 10" of sh. then a 5" layer of ss. followed by soft sh.

Upstream from the brink of the falls passes a coral bed is exposed at the head of the stream. The top of the falls brink is brought upstream by a faint undulation. The top is 6' above the brink of the falls at present.



Section at New Woodstock

soft sh.





The coral bed is in very sandy shale, and is about 6" thick. Other fossils in this bed besides corals are:

<i>S. pennatus</i>	<i>C. bellistriata</i>	<i>A. granulosa</i>
<i>R. fimbriata</i>	<i>Per. bean</i>	<i>C. coronatus</i>
<i>A. reticularis</i>	<i>Sch. pumila</i>	<i>L. perplana</i>
<i>S. cratulum</i>		

The shale above the 4" sandy bed is soft, blue-grey, micaceous, crumbles to small chips.

<i>For. bean</i>	<i>H. trigaster</i>
<i>H. bellistriata</i>	<i>T. submarginata</i>
<i>C. setigerus</i>	<i>L. fragilis</i>
<i>M. subbalata</i>	<i>C. bellistriata</i>
<i>C. congregata</i>	

This shale is only very moderately fossiliferous. The fauna of the sandy rocks not having passed above into this shale. This coral bed may be local, but also may represent the tail end of the Vesper reef.

Additional fossils in the ss are:

*C. congregata*  
*M. mytiloides*  
*A. princeps*

Coral beds are first exposed 150 paces upstream from brink of falls.



Sept 4.

0-5' 15" - brown, dark grey shale. The ravine traversed this day followed a by this 5' patch of shale.

## Section along the road.

At the road intersection and for 5' above it are little sandy (conglomerate) shales with very few fossils. I correlate this rock with the beppu rock exposed at the road cut at the turn-off.

1220' 15" - 1225' 15" - hard brittle shale, very few fossils.

*A. sandwicensis*

*S. linearis*

*Campanotrochidia*

1225' 15" - 1230' 15" - brown

1230' 15" - 1235' 15" - hard, yellowish shale, 1 1/2' thick, that is

below.

1235' 15" - 1240' 15" - mostly, a bit of bedded top & middle part of beppu shales & fossils.

1240' 20" - 1275' 55" - At the top of 1275' 55" is the top of the hard sandy layer 3 1/2' - 4' thick. This

which appears as a ridge on the cliffs at Dolphin falls. Rock has been exposed nearly continuously since it is about the intersection.

Below this hard layer the shale is soft, but still remains to a marked degree. It crumbles into small blocks, irregular fragments. This bed contains:

*S. linearis*

*L. linearis*

The Dolphin terminates between 8 & 9 steps above the hard layer at about 1330 A.T. It is well exposed. The sandy massive shale of the Dolphin forms the base of the hill being exposed on the south (the creek side) of the road. Dolphin forms a continuous flat at base of the south side of hill - 1330 (or 1335) is a good view of hill.



1548

$$\begin{array}{r} 168 \\ 42 \\ 336 \\ \hline 5200 \\ 312.58 \end{array}$$

06



The upper part of the Delphi is well exposed as a terrace or flat at 1320'. The sandy beds of the Delphi are about 15'.

Sept. 14.

### Section at Knights Falls.

First exposures examined are 167 paces upstream from the junction of Knights Falls brook with the Limestone creek. At the 167th paces is a ten foot cliff of soft grey shale that crumbles to small fragments. The shale weathers to a lighter grey. Fossils are:

<i>A. andacula</i>	<i>J. bellulus</i>	<i>M. pygmaea</i>
<i>A. umbonata</i> c	<i>P. spinulicosta</i>	
<i>C. mucronatus</i>	<i>Streptelasma</i> sp.	

Small concretions are common.

167 paces brings to about 915'

915' - 935' 20" - mostly soft shale with the fauna above. At the top of 935' 20" - the shale abounds in *C. mucronatus* and also contains a small variety of *D. carinatus*, and *C. conjugata*.

935' 20' - 940' 25" - Upper 3' is of hard calcareous, sandy shale containing:

<i>P. rugulata</i> c.	<i>C. mucronatus</i>
<i>J. carinatus</i>	<i>Pal. constricta</i>
<i>M. pygmaea</i>	<i>H. dekeyi</i>
<del><i>Palaeonit</i></del>	<i>C. setiferus</i>
<i>Paracyclostoma</i>	<i>C. conjugata</i>
<i>O. parvula</i>	<i>M. pygmaea</i>
<i>L. delia</i>	<i>A. andacula</i> (small)

The hard shale (calcareous) continues to 940' 25" - 970' 55" where the shale becomes somewhat softer. The above fauna holds for the 35' of hard shale up to 970' 55". Between 970' 55" and 975' 60" were seen:



## Section at Knight's Falls.

49' Shale

meanings, say, that 3-41

Slide	59'
-------	-----

ls. shale 5' (8) abounding in *T. carinatus*.

*Hand calamus* pl. 40'

soft sh. abounding in *Stauronota* &  
*A. andersoni*



*Pal. constructa*  
*A. princeps*  
*C. mucronatus*

*T. carinatus* c  
*M. concentrica*  
*C. coronatus*

975' 60" - 980' 65" - Limestone two feet covered  
 upper 3' of a soft sometimes limy shale  
 abounding in fossils, especially *T. carinatus*  
 Fauna in these lower shales are:

<i>T. carinatus</i> a	<i>C. indenta</i> re	<i>Stannysia</i> sp. r
<i>B. sulcomarginata</i> re	<i>C. vicinus</i> re	<i>A. decussata</i> r
<i>Pal. constructa</i> re	<i>H. dehayi</i> r	<i>P. flabellum</i> re
<i>H. oblongatus</i> re	<i>M. concentrica</i> re	<i>C. lophothus</i> re
<i>C. scitellus</i> r	<i>Cran. ham</i> r	<i>P. liata</i>
<i>O. parvula</i> r	<i>Par. ham</i> r	<i>M. subolata</i> re
<i>P. sectiformis</i> r	<i>C. mucronatus</i> re	<i>P. hermes</i> re
<i>A. princeps</i> r	<i>P. spinulosus</i> re	<i>P. radiata</i> r
<i>M. pygmaea</i> r	<i>P. liata</i> re	<i>P. iowensis</i> r

On top of this sh. is a kind of shaly ls.  
 abounding in crinoid stems and having  
 the following fossils:

<i>P. flabellum</i> re	<i>M. concentrica</i>
<i>R. vanuxemi</i>	<i>C. mucronatus</i>
<i>L. macroptera</i>	<i>A. decussata</i>
<i>P. sectiformis</i>	
<i>A. bulbosus</i>	

980' 65" - 985' 70" - succeeding the ls. is a soft  
 shale having, in the first 2 feet: -

*A. umbonata*  
*R. vanuxemi*  
*C. mucronatus*  
*Cyrtina* ham.  
*P. perplana*  
*C. lophothus*  
*C. indenta*  
*P. rana*  
*P. iowensis*  
*P. discoidum*



1895 - 1896



These lower 2' are like the ls. below in part but in the upper 3 they become very soft sh. with many small concretions.

985' 70" - 990" - 75" - lower 2' covered. Upper 3 1/2' like the shale at bottom of falls at Delphi.

*Pal. constricta*

*C. scitulus*

*C. mucronatus*

*P. purplana*

*A. umbonata*

*Lox. Shumtoniae*

*P. punctifera*

*B. submarginata*

There are 4 steps from the hard layer to the base of the falls, at 1000' 85". About 1' up from the base of the falls. *Pholidops* is abundant, its exact range however was not determined. Top of 1st fall is at (base of sandy bed) 1035' 120". The sandy bed is 38' above the base of the first falls or 59' above the calcareous bed (Mottville). The top of the second falls is 8 steps above the hard ledge, and the top of the Delphi is at 9 steps. This rise comes out 41 steps. This gives 49' for the rock above the hard sandy bed. The top at the top is calcareous, marked by fragments. It is 4-15' thick.

The top of the Pecksport on the Cassinova quadrangle appears to be the Mottville, making thus, the Cardiff much thicker than before suspected.







3/4 mile SW of rd. intersection at  
SW end of Hatch Lake.  
Sept 9.

Fauna in Portland Point member

<i>V. pustulosa</i>	<i>E. bispinosa</i>	<i>S. pinnatus</i>
<i>P. emarginata</i>	<i>R. cyclops</i>	<i>C. carolinensis</i>
<i>R. vanuxemi</i>	<i>C. bispinosa</i>	<i>H. carolinensis</i>
<i>L. perplana</i>	<i>I. pinnatus</i>	
<i>A. decussata</i>	<i>C. bispinosa</i>	
<i>I. pinnatus</i>	<i>I. pinnatus</i>	
<i>H. depressa</i>	<i>P. pinnatus</i>	
<i>P. rana</i>	<i>S. bispinosa</i>	
<i>C. pinnatus</i>	<i>I. pinnatus</i>	
<i>A. granulosa</i>	<i>R. pinnatus</i>	

The Portland Point member consists of about 8' of  
massive, pink and calcareous sandstone rock  
abundant in fossils. About 20' above it  
occurs the top of the Philadelphia beds.  
The exposure is good but variable. The  
fossils include the P.P. or P.P. (800 paces south of  
the house on the west side of the road) within  
the first 100 feet south of Hatch Lake. At this  
roadside exposure, bedded sandstone which  
goes to about 16' below the Philadelphia  
bed. The Portland Point is 18 steps (98') above  
the road level at about 1500' putting the Portland  
Point at 1598' A.T. 21' above the P.P. the rock was  
hard sandy stone.



1782  
1507  
249



## Lud. Shear. Contact.

NNE of Nelson

Sept 10'

Hand levelling begun at about 1455' A.T.

1455' - 1550' 95" - covered

1550' 95" - 1555' 100" - ~~covered~~Dusky grey arenaceous shale, fossiliferous  
*L. laura*

1555' 100" - 1560' 105" - arenaceous shale,

dusky grey, fossiliferous

*L. laura* & *S. sp.**C. sp.**A. sp.*1560' 105" - 1565' 110" - The shale is densely  
succeeded by a 3' bit of hard grey  
quite massive, and is followed by 2 1/2'  
of arenaceous shale. The first  
*L. laura* is common in the 2 1/2' of it.

1565' 110" - 1570' 115" - arenaceous shale.

*L. laura*

1570' 115" - 1575' 120" - same shale. Fossils rare

1575' 120" - 1590' 130" - shale becoming gradually  
coarser, breaking into thick plates and  
placards in construction, a few1590' 130" - 1595' 140" - thin, shaly, sandy  
shale, upper 3' shaly, cross-bedded, glass.1595' 140" - 1600' 145" - thin, shaly, cross-bedded, glass,  
shales, former predominant.1600' 145" - 1610' 155" - same, *L. fragilis*  
seen in a thin layer of it.1610' 155" - 1620' 165" - same, *L. fragilis*  
*L. fragilis*

1620' 165" - 1630' 175" - same, thin platy

1630' 175" - 1640' 185" - same, thin platy



$$\begin{array}{r} 1655 \\ 17 \\ \hline 1672 \end{array}$$

$$\begin{array}{r} 1205 \\ 12 \\ \hline 1217 \end{array}$$

$$\begin{array}{r} 1177 \\ 11 \\ \hline 1188 \end{array}$$



1620' 170" - 1625' 175" - mostly covered  
but a small patch of ss. has:

*P. flabellum* *R. granulosa*

1625' 175" - 1630' 180" - mostly slabby ss.

*C. congesta*

*P. flabellum*

1630' 180" - 1635' 185" - coarse sh. & slabby  
ss.

*P. flabellum*

1635' 185" - 1640' 190" - cross-bedded ss. &  
arenaceous shale.

1640' 190" - 1645' 195" - mostly platy, ss. &  
coarse shale, ripple on the ss.

1645' 195" - 1650' 200" - covered.

1650' 200" - 1655' 205" - top thin cross-bedded ss.  
On top of this ss. is an arenaceous shale  
containing:

*Trematis*

*P. marginata* *R. vanuxemi*

*Zonitum*

*D. inaequata* *C. congesta*

*S. sculptilis*

*L. p. plana*

*C. congesta*

*R. decorata*

*D. carinata*

*R. coronata*

1650' 205" - 1655' 210" - The foot of arenaceous  
shale is at the base & at the top is

6" of arenaceous shale. The intervening  
rock is covered. Fossils in the 4' of ss.  
are:

*Trematis*

*R. granulosa*

*L. p. plana*

*S. pinnatus*

*C. coronata*

*P. flabellum*

*R. fimbriata*

*C. squamida*

*C. congesta*

*S. sculptilis*

*H. cordiformis*

*C. congesta*

*P. marginata*

*R. decorata*

*C. congesta*

*P. sinuata*

*R. vanuxemi*

1655' 210" - 1665' 220" - covered

1665' 220" - 1670' 225" - all covered but 6"  
arenaceous sh. in middle of interval  
yielding:

*Trematis*

*R. decorata*

*S. pinnatus*

*S. pinnatus*

*C. congesta*

*H. sculptilis*

1670'



241

20



1670' 225" - 1680' 235" - covered  
 1680' 235" - 1685' 240" - small of porous  
 2 or 3' in gully of a massive sh.  
 coarse, sandy weathered to greenish gray  
 1685' 240" - 1690' 245" - Hard dense rock  
 fossils are:

*E. spinifrons*      *E. congregata*

*A. hirsuta*      *C. thick*

*P. fragilis*      *C. variata*

Rock extends for about 2' beyond this  
 interval being calcareous and becoming  
 thin layers mixed with shale layers.  
 This forms a conspicuous pit between  
 the two hills which the river divides.

The rock above the river is reddish  
 shattering in lower part is a coarse  
 arenaceous at the top breaks into irregular  
 slab-like shales.



75  
101  
26



Aug 31.  
Caydonia sheet

Hand-leveling begun at 810 at bridge & highway intersection. 32' above bridge is an exposure of the Marshall's shale.

In the main stream between 158 & 160 steps above the bridge the shale no longer has the brown streak but has a white streak. The transition from the Marshall's to the Cardiff must come at about 894' above sea level. The streak of the shale between 144 & 158 was lighter & thinner than below. Between 22 and 24 was again fissile like black shale having a white streak. A goniatite was the only fossil noted. From 22 on exposures have been good and are nearly continuous. At 26 was found:

*L. laura*

*Orthis*

At 1300 is a fault line. The faulting is from the right contact with the right which was followed up to 12 steps or 1038' ft. and is still. Blue black, undulating Cardiff shale for the whole distance.

This mine was hand-leveled up to 80 steps practically to the horizon in which the tunnel is located. Hand-leveling back the following were seen:

81-79 = shale, but it is being converted to lumpy pieces, left are various fossils but not abundant:

*S. crotalaria*  
*C. uncinatus*  
*G. p. planus*  
*P. p. planus*  
*S. p. planus*  
*A. undocula*  
*L. p. planus*  
*C. p. planus*

*S. p. planus*  
*G. p. planus*  
*L. p. planus*  
*Schiz. Channingensis*  
*P. p. planus*  
*P. p. planus*



79-77 - coarse shale, sandy, irregular  
fracture, abundant in chert nodules.  
S. pinnatus a S. costatum  
C. sinuatus M. concentrica  
Q. subovata Macchilina  
L. papposa

77-76" - the shale in this interval is much  
softer and crumbly to small pieces

L. spinulata a. umbonata  
L. laura H. randalli  
P. flabellum  
Q. andacula c

76' - 75" - shale soft (perhaps) all of this shale  
has a purplish cast to it when fractured.  
Q. andacula a P. longipora  
P. rugulata L. papposa

75-74" - same soft crumbly sh.  
Q. andacula c C. setigerus  
S. pinnatus a C. sinuatus  
L. papposa P. rugulata  
H. oblongatus Q. umbonata

74-72" - same - Fossils are abundant

72-70' - Sandstone common at the base  
of 72. The shale of this interval is very  
soft crumbly in the typical  
Chaff of shale in this interval.  
H. oblongatus S. pinnatus  
L. papposa C. setigerus  
Q. andacula c C. sinuatus  
H. laura C. chelonia sp.



1927

Sept 27

1525' A.T. small yellow Delphi  
*C. coronatus* *S. pumilus*  
*P. flabellum* *A. lydi*  
*O. delucata*

Sept 27<sup>2</sup>

1800' - 1850' 50" - a path of limestone about  
 10' above 1800' at road. Between 1850' 50"  
 & 1855' 50" - soft green shale that  
 must belong to the L. Lydi.

The limestone is exposed in a line  
 as far as 1357' A.T. 5' 8"  
 is an alternating series of thin  
 slabs and bands of soft green shale.

From the bottom of the L. Lydi here  
 to the road is 5' and from the road  
 to the first exposed Senessee is 5' 2".  
 This would put the L. Lydi between  
 these two. A few L. Lydi bryozoans are  
 in a gully across the abandoned road.  
 Actually about 2' of a shaly ls. is  
 exposed.

Act. all Senessee is exposed  
 for 45' above the road. The bottom  
 of the Senessee is about 50' of thin  
 stone with a few rather blue  
 when weathered and is fairly  
 gitty.

The Hypothyris layer is not here  
 as not granular to be so fairly  
 seen. The distribution of  
 L. Lydi suggests a thickness  
 of ten feet for the L. Lydi.



980

4

$$\begin{array}{r} 20' 20'' \\ 110 \quad 110 \\ \hline 133 \quad 13 \\ \hline 1441 \end{array}$$

$$\begin{array}{r} 980 \\ 144 \\ \hline 1124 \end{array}$$

$$\begin{array}{r} 994 \\ 119 \\ \hline 1113 \end{array}$$



18 steps up creek, 375 paces

The Tully here is on the Pitcher Quad and is in the west branch of Otsego Creek at 1478' A.T. It is a beautiful exposure. *Hypothyris* was seen abundantly in the bottom layer. The map indicates a thickness of 15-17'.

According to what the Cardiff would come in at about 1100' A.T. I believe this is too thin.

Large septaria, like those of the Marshallus were seen about 40' up in the Cardiff from the base.



$$\begin{array}{r} 1080 \\ 960 \\ \hline 120 \end{array}$$

$$\begin{array}{r} 1102 \\ 960 \\ \hline 142 \end{array}$$

$$\begin{array}{r} 1125 \\ 960 \\ \hline 165 \end{array}$$

$$\begin{array}{r} 981' \\ 20' \quad 20'' \\ 3' \\ \hline 110 \quad 110 \\ 1014 \quad 130 \end{array}$$

$$\begin{array}{r} 981 \\ 110 \\ \hline 1091 \\ 11 \end{array}$$



0 130'  
54'  
76'

Sept 6.

1295  
76  
1220

Lowest rock exposed in ravine is 15' of coarse, massive, arenaceous shale abundantly in *L. laura* and having also *P. fragilis*. This is the Randolphville shale.

0' - 10' 10" - Coarse arenaceous shale abundant in *L. laura*

10' 10" - 25' 25" - covered

25' 25" - 30' 30" - Massive bluish arenaceous shale that strongly resembles the Red Gate *L. laura* a.

At the top of this interval the following were seen:

*L. laura* a. *H. arguta* a.  
*P. linearis* a. *C. angusta*

The color at the top of this interval was dark gray, but at the top it became distinctly bluish color.

30' 30" - 35' 35" - same shale

*L. laura* a. *C. angusta*  
*L. laura* a. *C. angusta*  
*C. angusta* a. *P. linearis* a.

35' 35" - 40' 40" - shale mostly same but has a few thin bluish ss. layers. *L. laura* abundant. The whole interval in large forms. *P. fragilis*

40' 40" - 45' 45" - massive sandy shale, blue gray and thin ss. *L. laura* *P. linearis*

Upper 2' covered

45' 45" - 50' 50" - lower 2' covered - Upper 3 1/2' fossil of rock =

Bluish gray sandy shale:

<i>J. cuneata</i>	<i>A. andacula</i>	<i>C. angusta</i>
<i>C. vicina</i>	<i>T. laura</i>	<i>H. arguta</i>
<i>P. stricta</i>	<i>P. scitiformis</i>	<i>C. bellistincta</i>



<i>P. oval</i>	<i>S. sculptilis</i>	<i>C. h. h. h.</i>
<i>L. volensides</i>	<i>R. v. v. v.</i>	<i>A. reticularis</i>
<i>C. p. p.</i>	<i>G. granulosa</i>	<i>L. perplana</i>
<i>P. h. h.</i>	<i>L. h. h.</i>	<i>P. h. h.</i>
<i>P. constricta</i>	<i>M. concentrica</i>	<i>S. h. h.</i>
<i>M. constricta</i>	<i>M. pygmaea</i>	<i>P. h. h.</i>
<i>L. h. h.</i>	<i>L. h. h.</i>	

Geologically and finally this rock  
strongly resembles that of the Eschelle  
shale. This horizon may well be above  
the Centerville but may be the east of  
it at the same time. I see shale  
beds at that horizon.

50'50" - 55'35" - mostly covered.

Up to 1/2" - fine grey sandy shale  
with *C. h. h.* and *R. v. v.*

55'35" - 60'80" - covered.

60'80" - 65'86" - hard massive shaly ss.

*C. h. h.* and *P. h. h.*  
A foot or more thick the top surface is covered  
with a thin layer of equally  
sandy rock.

65'85" - 90'90" - rock shaly but mostly the  
same.

90'90" - 95' - 95' - fine grey ss.

95'95" - 120'120" - bridge.

Bridge is at 1295'.

Handling from bridge at 1295' - 1295'

32' up from the base of the blue  
grey shale.

<i>L. h. h.</i>	<i>L. h. h.</i>
<i>C. h. h.</i>	<i>G. h. h.</i>
<i>M. h. h.</i>	<i>M. h. h.</i>
<i>P. h. h.</i>	<i>P. h. h.</i>
<i>C. h. h.</i>	

This is apparently the same horizon  
as behind C. H. Hunt's farmhouse



apt 6

Co. in sh.

hard shale 2'

soft shale 16' *Platystrophia* bed

shale 2'

*Platystrophia* bed 2'

1585

sandy shale 25'

A.

crossbedded ss (5')

sandy sh 28'

B

coarse sandy sh 11'

*Platystrophia* bed 1'

coarse bedded ss 4 1/2'

coarse shale

C

D 125'

sh. sandy sh

Road cut 1395' AT.

1' covered

blue sh 2' *L. laura* c

9' covered

blue grey sh. 6'

Hard sandy rock 6'

*L. laura*  
*P. laura*  
*P. laura*

27' covered

sh 2' covered 3'

sh 3' covered 5'

coarse sh with

*L. laura*

Hardenville



PP is at 1485'

The basal member of the Portland Point comes at 35 paces above the bridge or at 1585' A.T.C. It is 2' thick most of ls. It is succeeded by about 1' of shale capped by a 6" calcareous l.f. The lower the shale is calcareous in the form of lentils, and an *Orthis fossilifera* fossil seen in the shale of ls. above the P.P. basal plane.

<i>C. micans</i>	<i>C. coronatus</i>	<i>L. pennatus</i>
<i>L. carinatus</i>	<i>R. vancouver</i>	<i>L. papilion</i>
<i>L. pennatus</i>	<i>C. granulosa</i>	<i>J. acuminata</i>
<i>E. brachycephala</i>	<i>C. boothi</i>	

The soft ls. of the P.P. is abundant in *S. subrotatus*.

In the hard shale layer at the top 9"-1" were seen:

<i>P. radiata</i>	<i>H. brachycephala</i>	<i>H. pygmaea</i>
<i>L. delia</i>	<i>C. setigerus</i>	<i>S. brachycephala</i>
<i>L. pennatus</i>	<i>L. ellipticus</i>	<i>C. granulosa</i>
<i>C. undulata</i>	<i>C. boothi</i>	<i>C. coronatus</i>
<i>C. apiculatus</i>	<i>L. carinatus</i>	

In the white ls. below this layer were seen:

<i>C. carinatus</i>	<i>L. pennatus</i>	<i>L. carinatus</i>
<i>P. radiata</i>	<i>L. carinatus</i>	<i>P. parallelus</i>
<i>C. carinatus</i>	<i>C. boothi</i>	<i>H. brachycephala</i>
<i>H. pygmaea</i>	<i>P. himmies</i>	<i>A. erectum</i>
<i>H. brachycephala</i>	<i>P. carinatus</i>	<i>L. capillaris</i>
<i>B. lida</i>	<i>B. brachycephala</i>	<i>B. carinatus</i>

For 10' above the P.P. *L. pennatus* + *L. carinatus* are abundant at about 6 or 7' *P. parallelus* comes in and ~~abundant~~ with *P. radiata*, the former in greater abundance temporarily. *L. carinatus* is abundant for only about 10'. Small black concretions are not uncommon at the top.



680  
550  
130

310

530  
490

140



*S. tullius* is common in a small calcareous patch a short distance below the top layer. No characteristic (or any other kind) specimens reaching 5' or 6' from the top of shale and this would constitute an important difference between this rock and the shaly Portland Point.

Fossils seen in P.P. limy bed (basal bed)

<i>R. vancouver</i>	<i>I. carinatus</i> c	<i>S. tullius</i>
<i>C. impressa</i> b	<i>S. pernatus</i>	<i>H. dehaage</i>
<i>C. conjugata</i>	<i>C. carinata</i>	<i>P. rana</i>
<i>L. pelopona</i>	<i>V. pustulosa</i>	<i>M. concentrica</i>
<i>C. carinata</i>	<i>S. pernatus</i>	

*V. pustulosa* was found in the layer at bottom of the bed. This locality is excellent for the Portland Point as it is in the field as well as in the gully.

Fauna in A.

<i>S. pernatus</i>	<i>A. vancouver</i>	<i>R. princeps</i>
<i>T. carinata</i>	<i>C. carinata</i>	

Remains of A. vancouver seen in fine exposure South of the river.

Fauna in P.P.

Top bed in P.P. is calcareous and contains:

<i>S. tullius</i>	<i>S. carinata</i>	<i>C. carinata</i>
<i>S. pernatus</i>	<i>I. carinatus</i>	<i>P. rana</i>
<i>M. concentrica</i>	<i>C. granulosa</i>	

at the top of the 15' below top -

<i>I. carinatus</i>	<i>H. dehaage</i>
<i>S. pernatus</i>	

About 15' from the top the rock is softer. The cross bedded ss. extends for about 5' from the top of the top.



Fossils in the soft rock are:

<i>S. pennatus</i>	<i>C. setigera</i>
<i>H. trigona</i>	<i>C. tenuistriata</i>
<i>H. arcuata</i>	<i>P. radiata</i>
<i>P. flabellum</i>	<i>P. lanceolata</i>
<i>T. armatus</i>	<i>T. armatus</i>

Fauna in C.

<i>T. armatus</i>	<i>C. coronatus</i>	<i>H. trigona</i>
<i>S. pennatus</i>	<i>C. setigera</i>	<i>H. elongata</i>
<i>A. erectum</i>	<i>C. ballistata</i>	<i>P. discoides</i>
<i>T. armatus</i>	<i>M. concentrica</i>	<i>L. gabbi</i>
<i>P. githus</i>	<i>H. ballistata</i>	<i>L. subuloides</i>
<i>P. modicostata</i>	<i>C. tenuistriata</i>	<i>P. flabellum</i>
<i>A. princeps</i>	<i>B. capellina</i>	<i>A. granulosa</i>

C. found a 11' fall

B. found a 11' fall

A. found a 20' fall over the Portland Point

Fossils seen in *Pholidostrophia* bed.

<i>P. immanis</i>	<i>S. pennatus</i>
<i>M. concentrica</i>	
<i>T. armatus</i>	
<i>A. granulosa</i>	
<i>L. periplana</i>	

I believe the hard sandy rock at the top of the section downstream from the bridge represents the same rock as exposed at New Woodstock but the coral beds were not seen.



$$\begin{array}{r} 1140 \\ 130 \\ \hline 1310 \end{array}$$

$$\begin{array}{r} 1310 \\ 140 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 65 \\ 5 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 1160 \\ 70 \\ \hline 1230 \end{array}$$



Sept 82

The thin calcareous layer at the (1' below) top of the Randallville was noted 95' below the highway with about 5-7' of sandy sh. below it. Also the layer was seen:

*A. decussata*      *C. muricata*

*H. angusta*

*P. flabellum*

Sept 83

Road Section

0'-5'5"- Coarse gray sandy shale

*S. pennatus* a

*L. purpuraria*

*C. lamellata*

*H. concinna*

*A. spiniferoides*

*H. chusqueensis*

*L. junia*

*C. coronatus*

*T. murus*

*P. flabellum*

*H. alta*

*S. demissa*

5'5"-10'10"-

*S. pennatus* a

*A. spiniferoides*

*P. flabellum*

*C. muricata*

10'10"-15'15"-

*P. flabellum*

*S. pennatus*

*A. strictum*

*H. liratum*

*L. chusqueensis*

At about the top of 15'15" the shale is very hard and sandy, the next step begins a softening and a branching



fossils:

*L. junia* c.

*S. demissa* c.

*A. vancouveria*

*O. carinata*

*S. pinnatus*

*A. reticulatus*

*A. spiniferoides* c.

*Cyrt. blanda*

*W. elongatus*

*S. demissa* ranges thru the whole  
S.

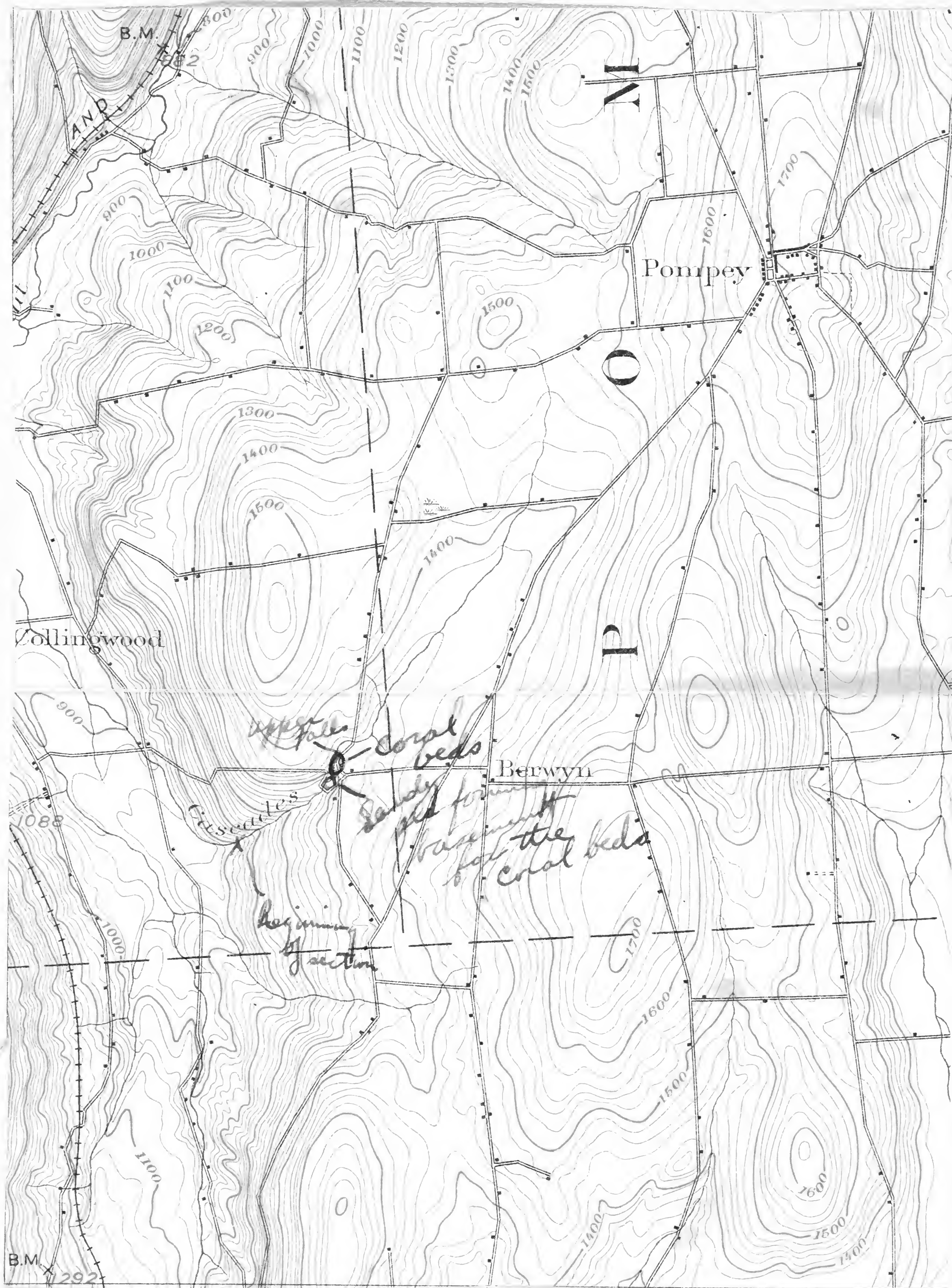
15' 25" - 20' 25" - mostly covered.

20' 25" - 25' 25" - covered.

25' 25" - 30' 35" - covered.



305a



Tully quad.  
Aug 27, 1928



1975

Aug 27.  
Columbia Falls. = (The Cascades)

*M. sp.*

H. Hester

P. lutea

*C. albicollis*

*P. pinnatifida*

5'5" - 10'10" - covered

A. *Sedula* *torus*

G. Costa



70' 90' - 85' 130' - same as above - about 15' below  
 the top of the ... is abundant. This is chiefly very small ...  
 and ... the ... according to  
 their ... in ...  
 top of the fall ... about 10' from the  
 bank ...  
 The ... is ...  
 sandy shale. This is ... below ...  
 is common at the ... of the fall ...  
 10' below the ... that  
 forms the ledge.

135' 130' - ...  
 Here ...  
 falls. ...  
 is at about 140' ...  
 ...  
 base of the ...

140' 140' - 150' 150' - ...  
 150' 150' - 155' 155' - ...

*Calymene* (very large)  
*Trilobites*

155' 155' - 160' 160' - same as top of  
 155' ...  
 ...  
 ...

160' 160' - 165' 165' - ...  
 ...  
 ...



175' 175" - 180' 180" - rock is very coarse, breaks into thick irregular pieces.

*S. permatia* 12      *C. curta* 1

*M. triquetra*

The contact here near the contact of the Centerville & the Pottsville

180' 180" - 185' 185" - no fossils were found in this part of the falls except one *Strophomena* referred to 24, above. The rocks here are very coarse and clearly belong to the Centerville.

185' 185" - 190' 190" -

*Strophomena*

190' 190" & 195' 195"

195' 195" - 200' 200" - top of falls. The upper part of the Centerville is clearly a ss. but the lower bedded layers like those at Fallowa falls were not included. If the thickness of the ss. is 10' then the lower ss. layers would be 32', and if *Strophomena* is used it would be essentially the same.

Fossils seen in lower slabs of the Centerville

*Strophomena*

*Strophomena*

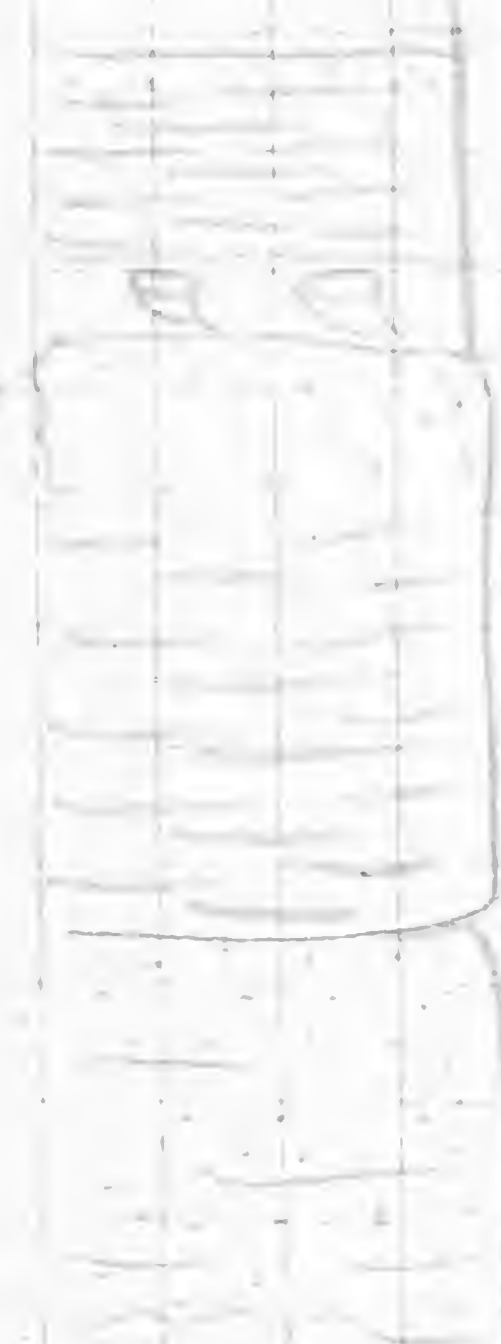
*Strophomena*

*Strophomena*

The top of the ss. is a coarse, massive rock, very resistant and some thin bedded ss.



Constitution



8'

const. 7'

52'

Centrifugal 52'



Above the Centerfield is the gray  
arenaceous shale of the Eschville.

*R. articulata*

*S. carinata* &

*S. pinnatifida*

*S. pinnatifida*

*M. concentrica*

*P. subquadrata*

*A. granulosa*

*R. unguis*

*M. mytiloides*

*P. stephanos*

*L. parvula*

*E. subquadrata*

*L. junia*

*M. concentrica*

*P. pinnatifida*

*R. parvula*

*R. pinnatifida*

*A. spinifrons*

*A. decussata*

*Cup. corals.*

*C. corugata*

*Cl. ham.*

It was 6 steps from the falls to bridge, 159 to top of falls.

52' above the Centerfield is another  
falls about 11 feet high, north of road  
sandy shale & not fossils. This is the  
same as at Lakewood Falls. Above this  
comes the sandstone bed, then a fall of  
about 8' over hard sandy rock, chert & etc.  
~~The corals beds to be at least 10' thick.~~

Between the top of the sandy shale and  
the top of the Coral beds is about 7'. The  
corals occupy at least the upper 5' of  
this 7'. The lower contact could not  
be observed.

Additional fossils in shale above  
Centerfield:

*S. divaricatus*

*C. sistrulus*

*C. elongata*

*C. grandulata*

*Par. ham.*



Additional Specimens Collected

*A. deussata*

*Strombus*

*S. pyramidalis*

*S. pinnatus*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

*C. subulata*

Conklin's Falls consisted at the bottom of soft dark shale which may belong to the glauconites but more probably in my Randallville. From the base and for about 180' the rock is a barren nearly sandy shale, abounding at the top in *L. flava*. This grades gradually into the Centerfield which consists of about 30' of hard sandy rock, difficult to collect because exposed mostly as cliff faces. This is succeeded by 52' of rock, soft sandy and very fossiliferous at the bottom, becoming sandy at the top and forming a falls a short distance above the bridge. This is succeeded by the coral reef (same as at Fellows Falls) and this by 8' of shale and sandy shale forming a falls at the second old mill and dam. The creek was followed no farther upstream as it flattened here considerably.



